

CODE OF MASSACHUSETTS REGULATIONS
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CODE OF MASSACHUSETTS REGULATIONS
TITLE 522: BOARD OF BOILER RULES

CHAPTER 522 CMR 1.00: RESERVED **GENERAL PROVISIONS**

CHAPTER 2.00: POWER BOILERS

12.01: Scope and Authority, ~~Scope and Definitions~~

In accordance with the provisions of M.G.L. c. 146, § 2, the Board of Boiler Rules herewith adopts by reference the 200 A.S.M.E. Boiler and Pressure Vessel Code Section I, *Power Boilers* with addenda, with the exception of the method used to determine the safety valve relieving capacity.

The A.S.M.E. code is on file with the State Secretary, but is not published with the Code of Massachusetts Regulations by reason of it's being reasonably accessible to that portion of the public affected by it.

- (1) Pursuant to M.G.L. c. 146, § 2, the Board shall formulate or adopt rules formulated by a recognized engineering organization for the construction, installation and inspection of steam ~~boiler~~Boilers and power reactor vessels and piping as used in atomic energy installations and for ascertaining the safe working pressure to be carried therein; prescribe tests, if it deems it necessary, to ascertain the qualities of materials used in the construction of ~~boiler~~Boilers, power reactor vessels and piping; formulate rules regulating the construction and sizes of safety valves for ~~boiler~~Boilers of different sizes and pressures, appliances for indicating the pressure of steam and the level of water in the ~~boiler~~Boiler or power reactor vessel, and such other appliances as the Board may deem necessary to safety in operating steam ~~boiler~~Boilers or power reactor vessels; and make a standard form of Certificate.
- (2) Pursuant to M.G.L. c. 146, § 35, the Board shall prescribe regulations conforming to recognized standards of engineering practice for the size, shape, construction, gauges, operation, maximum pressure, safety devices, use of oil, and other appurtenances necessary for the safe operation of tanks or other receptacles used for the storing of compressed air.

- (3) Pursuant to M.G.L. c. 146, §§ 43 and 45A, the Board shall adopt rules for the size, design, location and piping of safety valves on ammonia compressors, refrigeration and air conditioning systems.
- (4) Pursuant to M.G. L. c. 146, §§ 70 and 71, the Board shall adopt rules for the construction, installation and inspection of all hot water ~~heating boiler~~Low Pressure/Heating Boilers.
- (5) All reconstruction must conform to the original stamped code of construction for all ~~boiler~~Boilers and Pressure Vessels covered by ~~this regulation~~522 CMR.
- (6) The Board shall hold public hearings annually on the first Thursday in May and November, and at such other times as it may determine, on petitions for changes in the rules formulated by it. If, after any such hearing, it shall deem it advisable to make changes in said rules, it shall appoint a day for a further hearing, and shall give notice thereof and of the changes proposed by advertising in at least one newspaper in each of the cities of Boston, Worcester, Springfield, Fall River, Lowell and Lynn, at least ten days before said hearing. If the Board on its own initiative contemplates changes in said rules, like notice and a hearing shall be given and held before the adoption thereof. Pursuant to M.G.L. c. 146, § 4, changes in the rules which affect the construction of new Boilers shall take effect six months after their filing as provided in section two; provided, that the Board may, upon request, permit the application of such change in rules to Boilers manufactured or installed during said six months. When a person desires to manufacture a special type of Boiler the design of which is not covered by the rules formulated by the Board, he shall submit drawings and specifications of such Boiler to said Board, which, if it approves, shall permit the construction thereof. Pursuant to M.G.L. c. 146, § 4, any changes in the regulations that affect the construction of new boilers must take effect six months after their filing. The Board may allow the new construction requirements to apply to boilers constructed during that six month time period.

1.02. Definitions-

-The following words and terms, when used in 522 CMR, shall have the following meanings:

Alteration. A change in the item described on the original Manufacturer's Data Report which affects the pressure containing capability of the pressure-retaining item.

Nonphysical changes such as an increase in the maximum allowable working pressure (internal or external), increase in design temperature, or a reduction in minimum temperature of a pressure-retaining item shall be considered an alteration pursuant to the NBIC.

ANSI. American National Standards Institute

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Approved Nationally Recognized Testing Laboratory. A laboratory that is acceptable to the Board and provides uniform testing and examination procedures and standards for meeting design, manufacturing, and factory testing requirements of ANSI/ASHRAE 15; is organized, equipped, and qualified for testing; and has a follow-up inspection service of the current production of the listed products. (Pursuant to ANSI/ASHRAE 15-2010).

~~Approved. Approved by the Commissioner of Public Safety, in consultation with the Chief for the Department of Public Safety, which comply with 522 CMR 18.00.~~

Appurtenance. A component or piping added to a ~~boiler~~Boiler/Pressure Vessel, necessary for the proper operation.

ASHRAE. American Society of Heating, Refrigerating, and Air-Conditioning Engineers.

ASME. American Society of Mechanical Engineers.

ASNT. The American Society for Nondestructive Testing.

Authorized Inspector. An employee of an authorized insurance company holding a Certificate of Competency as a ~~boiler~~Boiler inspector, issued to them by the Department to perform shop inspections, ~~reconstruction~~alterations, ~~repair~~ inspections and field inspection of ~~boiler~~Boilers within the Commonwealth. All Authorized Inspectors shall also hold a valid ~~and current~~ National Board Commission.

Authorized Manufacturer (Refrigeration and Air Conditioning Systems). A manufacturer which holds a certificate of authorization to use the appropriate ASME Code Stamp to build pressure vessels for use in the Commonwealth of Massachusetts.

Authorized Manufacturer (Heating ~~Boiler~~Boilers). A ~~boiler~~Boiler manufacturer which holds a certificate of authorization to use the ASME Code "H" or "U" stamps.

Authorized Manufacturer (Steam and Hot Water ~~Boiler~~Boilers and Heat Storage Sources). A ~~boiler~~Boiler manufacturer which holds a certificate of authorization to use the ASME Code "H", "S", or "U" stamps.

Authorized Nuclear Inspector. Holds NBIC Commission with a nuclear endorsement (N).

Authorized Nuclear Inspector (Concrete). Holds NBIC Commission with a nuclear endorsement (C).

Board. The ~~B~~board of ~~boiler~~Boiler ~~r~~Rules appointed under M.G.L. c. 22, § 10.

~~Boiler~~Boiler. A closed pressure vessel in which water is heated, steam is generated, steam is superheated or any combination thereof, under pressure or vacuum for use externally to itself by the direct application of heat from the combustion of fuel, or from electricity or nuclear energy. The term "~~Boiler~~Boiler" shall include fired units for heating

or vaporizing liquids other than water where these units are separate from processing systems and are complete within themselves. The term “~~Boiler~~Boiler” shall include unfired pressure vessels where steam is generated by a source of heat other than from the direct application of heat from the combustion of fuel, or from electricity or nuclear energy. ~~(for example, clean steam generators that use steam or high temperature hot water as the energy source).~~

Certificate. Certificate of inspection issued by the Department of Public Safety.

Certificate of Competency. ~~A certificate issued to individuals pursuant to M.G.L. c. 146, § 62~~Certificate issued by the Department to individuals who have satisfactorily passed the boiler inspector's examination prescribed by the Department, giving said individuals a Certificate of Competency to inspect boilers, its appurtenances and all other devices prescribed under Massachusetts General Law Chapter 146.

Chief. The Chief of Inspections - Mechanical for the engineering division in the Department of Public Safety.

Commissioner. ~~The~~- Commissioner- of Public Safety.

Deaerator. A ~~p~~Pressure ~~v~~Vessel classified as a ~~h~~Heat ~~s~~Storage ~~s~~Source that uses steam to remove oxygen and carbon dioxide from ~~boiler~~Boiler feedwater.

Decommission. The process in which a Boiler or Pressure Vessel is made inoperable or dismantled, and removed from service.

Department. The Department of Public Safety.

District Engineering Inspector. An inspector of the Division.

Division. The division of inspection of the Department of Public Safety.

Engineer in Charge. A person who holds a valid and current Massachusetts Engineer's or Fireman's license issued by the Department, and is designated by the Owner/User as the “Engineer in Charge” and who is ~~invested by the Owner/User with the in~~actual authority for:

- (a) ~~The daily operation-and, maintenance, and repair of the Boilers, Pressure Vessels, engines, and Appurtenances of the steam boilers or engines~~ specified and;
- (b) All persons operating, maintaining,- repairing these ~~boiler~~Boilers, Pressure Vessels, engines, and Appurtenances-or engines.

External Inspection. An ~~operational~~ external inspection of a ~~boiler~~Boiler and Appurtenances while the unit is operating. ~~The inspection should test all operating and safety controls that have the functionality and design to be tested, as well as observing the general overall external condition.~~inspector shall observe the pressure of steam carried and the general condition of each Boiler, and ascertain if the safety valve and the appliances for indicating the pressure of steam and level of the water in the boiler are in proper working order. Boilers pursuant to M.G.L. c. 146, § 70 may be externally inspected when the unit is not in operation by the inspector reviewing evidence provided by the owner or user of which tests have been completed.

First Inspection. An inspection of a ~~boiler~~Boiler, ~~p~~Pressure ~~v~~Vessel, ~~h~~Heat ~~s~~Storage ~~s~~Source, refrigeration system, air tank, that has, regardless of its age or installation date, never before been inspected by a District Engineering Inspector or an Authorized Inspector in the Commonwealth. Pursuant to M.G.L. c. 146 § 6, a District Engineering Inspector shall perform a The First Inspection of all steam ~~boiler~~Boilers and ~~air tanks~~Pressure Vessels that were installed after September 13, 1977shall be performed by a District Engineering Inspector.

Gas Turbine. A device using combustion gasses directly in a turbine. The basic components of a gas turbine consist of a compressor, combustor and turbine. Fuel used in a gas turbine is natural gas, high quality fuel oil, synthetic gas or liquefied coal.

Heat Storage Source. A potable water heater or water storage tank, ~~Deaerator or steam accumulator~~ -constructed to Section IV and/or Section VIII of the ASME ~~Boiler~~Boiler and Pressure Vessel Code, respectively, ~~or a Deaerator.~~

High Pressure/Power Boiler. Water at pressures exceeding one hundred sixty (160) PSIG or temperatures exceeding two hundred fifty (250°) degrees Fahrenheit, or a steam ~~boiler~~Boiler at pressures exceeding fifteen (15) PSIG.

Instructor. Any person who instructs an approved continuing education program for engineers or firemen. The Instructor shall hold the same grade or greater of Massachusetts engineer or fireman license to the level of course they are instructing. ~~An engineer or fireman will not be given credit for any programs or courses instructed by a person holding a lesser grade license, unless they are a guest speaker approved by the Instructor or Monitor. Instructors shall only be credited hours for the actual non-redundant time that they have spent actively participating in the instruction of the program.~~

Internal Inspection. A thorough inspection that is performed on a ~~boiler~~Boiler water and fireside, when the ~~boiler~~Boiler is not operating and is open, in accordance with the NBIC.

Low Pressure/Heating Boiler. A steam ~~boiler~~Boiler at pressures not exceeding fifteen (15) PSIG, or ~~a~~-hot water at pressures not exceeding one hundred sixty (160) PSIG or temperatures not exceeding two hundred and fifty (250°) degrees Fahrenheit.

Machinery Room. A space, meeting the requirements of Section 8.11 and 8.12, that is designed to house compressors and pressure vessels pursuant to ANSI/ASHRAE 15-2010.

Massachusetts Heat ~~Boiler~~Boiler. A steel plate ~~boiler~~Boiler built by an authorized manufacturer in accordance with Section IV of the ASME Boiler and Pressure Vessel CodeASME Code but not stamped with the Code symbol.

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Mass Tag. A noncorrosive metal tag attached to the vessel with a noncorrosive metal wire.

MAWP. Maximum Allowable Working Pressure.

Minimum Allowable Thickness. The minimum thickness permitted in accordance with the provisions of the applicable section of the original code of construction.

~~Monitor. An individual who oversees and has been appointed as the administrator for any approved continuing education program for engineers and firemen. It is not required that the monitor is physically present in each class. All Monitors must hold either a Massachusetts Engineer's or Fireman's license of equal or greater grade of the instructors of any approved program. Monitors shall only be credited hours for the actual non-redundant time that they have spent actively participating in the instruction or design of the program.~~

National Board. The National Board of ~~Boiler~~Boiler and Pressure Vessel Inspectors.

National Board Commissioned Inspector. An inspector employed by an authorized insurance company who holds a valid ~~and current~~ National Board Commission, or such other individuals who hold a valid ~~and current~~ National Board Commission.

NBIC. National Board Inspection Code-2011.

NFPA. National Fire Protection Agency.

Operator. ~~The~~A person who operates ~~the vessels~~a Boiler, Pressure Vessel, steam engine, and their Appurtenances.

Owner/User. -Any person, firm or corporation legally responsible for the safe operation of any pressure-retaining item, steam engine or their Appurtenances pursuant to NBICM.G.L. Chapter 146 and 522 CMR.

Pressure Vessel. A vessel in which the pressure is obtained from an external source or by the application of heat from an indirect source or from a direct source, other than a vessel defined as a "~~Boiler~~Boiler" in this section.

Reportable Accidents/Incidents. Accidents or incidents that result in Serious Injury/Illness or ~~d~~Damage exceeding \$10,000 per incident.

Refrigerating System. A combination of interconnected parts forming a closed circuit in which refrigerant is circulated for the purpose of extracting, then rejecting, heat.

(a) Absorption System. A refrigerating system in which the gas evolved in the evaporator is taken up by an absorber or adsorber.

(b) Sealed Absorption System. A unit system or Group 2 refrigerants only, in which all refrigerant-containing parts are made permanently tight by welding or brazing against refrigerant loss.

(c) Self-Contained System. A complete, factory-assembled and factory-tested system that is shipped in one or more sections and has no refrigerant-containing parts that are joined in the field by other than companion or block valves.

(d) Unit System. A self-contained system which has been assembled and tested prior to its installation and which is installed without connecting any refrigerant-containing parts. A unit system may include factory-assembled companion or block valves.

R-1 Forms. Report of repair issued by the NBIC.

R-2 Forms. Report of alteration issued by the NBIC.

Repair. The work necessary to restore pressure-retaining items to a safe and satisfactory operating condition pursuant to the NBIC.

Routine Repair. Repairs for which the requirement for in-process involvement by the District Engineering Inspector or Authorized Inspector and stamping by the "R" Certificate Holder may be waived as determined by the Chief and the District Engineering Inspector or Authorized Inspector and documented on an R-1 Form as a "Routine Repair" under the Remarks section, in accordance with the NBIC Part 3. ~~Repairs for which the requirement for in-process involvement by the District Engineering Inspector or Authorized Inspector and stamping by the "R" Certificate Holder may be waived as determined by the Department and the District Engineering Inspector or Authorized Inspector in accordance to the NBIC and documented on an R-1 Form as a "Routine Repair" under the Remarks section.~~

"R" Certificate Holder. An organization in possession of a valid "R" Certificate of Authorization issued by the National Board pursuant to the NBIC.

Serious Injury/Illness. A personal injury/illness that results in death, dismemberment, significant disfigurement, permanent loss of the use of a body organ, member, function, or system, a compound fracture, or other significant injury/illness that requires immediate admission and overnight hospitalization and observation by a licensed physician.

Temporary Use ~~Boiler~~Boiler. A portable ~~boiler~~Boiler which is installed for not more than one year.

~~-and which may or may not be installed inside a boiler room, temporary room, or temporary shed or without external covering.~~

~~Ton of Refrigeration. The rate of heat removal of heat at a rate of 12,000 BTU/hr per 522 CMR 9.00 one ton of refrigeration is equal to one horse power.~~

1.03: Standards Adopted

The standards listed below are adopted and incorporated as part of 522 CMR 1.00. ~~Boiler~~Boilers and Pressure Vessels constructed in accordance with the ASME standards or other recognized engineering standards in effect at the time of the manufacture shall be considered constructed in accordance with the following standards. ~~The standards adopted are on file with the State Secretary.~~

ANSI/ASHRAE

~~15-2010~~13 Safety Standard for Refrigeration Systems
~~34-2010~~13 Designation and Safety Classification of Refrigerants

ANSI/ASME Code for Pressure Piping, B31

~~B31.1-2010~~ Power Piping
~~B31.3-2010~~ Process Piping
~~B31.5-2010~~ Refrigeration Piping and Heat Transfer Components
~~B31.9-2010~~ Building Service Piping

ASME ~~Boiler~~Boiler and Pressure Vessel Code, ~~2010~~2015 Edition (2011a Addenda)

Section I	Rules for Construction of Power Boiler Boilers
Section II	Materials <ul style="list-style-type: none">• Part A – Ferrous Materials Specifications• Part B – Nonferrous Materials Specifications• Part C – Specifications for Welding Rods Electrodes and Filler Metals• Part D – Properties
Section III	Rules for Construction of Nuclear Facility Components
Section IV	Rules for Construction of Heating Boiler Boilers
Section VIII	Rules for Construction of Pressure Vessels
Section IX	Welding and Brazing Qualifications
Section X	Fiber-Reinforced Plastic Pressure Vessels
Section XI - Division 1	Rules for Inservice Inspection of Nuclear Power Plant Components

ASME CSD-1-200915 Controls and Safety Devices for Automatically Fired ~~Boiler~~Boilers

Part CW Steam and Waterside Control

The following standards are adopted by 522 CMR 1.00 and are available from the National Board.

National Board Inspection Code, 2014~~5~~ Edition

<u>Part 1</u>	<u>Installation</u>
<u>Part 2</u>	<u>Inspection</u>
<u>Part 3</u>	<u>Repairs and Alterations</u>

The following standards are adopted by 522 CMR 1.00 and are available from the National Fire Prevention Association.

NFPA 85 Boiler and Combustion Systems Hazards Code – 2015 Edition

References to the external standards throughout 522 CMR shall be to the specific external standards adopted in this section, 522 CMR 1.03, unless otherwise clearly stated.

1.04: Department Jurisdiction

- (1) Enforcement. Pursuant to M.G.L. c 146, § 5, the Department shall enforce M.G.L. 146 and 522 CMR except when otherwise provided.
- (2) District Engineering Inspectors may enter any premises pursuant to M.G.L. c. 146, §5.
- (3) Inspection. A District Engineering Inspector shall perform the First Inspection of a ~~Boiler~~Boiler or Pressure Vessel required by M.G.L. c. 146, §§ 6-7.
 - (a) ~~Boiler~~Boilers. All ~~Boiler~~Boilers and their Appurtenances, except those specified in M.G.L. c. 146, § 7, which includes ~~boiler~~Boilers of railroad locomotives, motor vehicles or steam fire engines brought into the Commonwealth for temporary use in times of emergency, nor to ~~boiler~~Boilers used in private residences, nor to those used for heating purposes which carry pressures not exceeding fifteen pounds to the square inch and have less than four square feet of grate surface, nor to ~~boiler~~Boilers of not more than three horse power, shall be thoroughly inspected externally and internally under the specifications of 522 CMR 2.00 and 522 CMR 4.00. Upon written application made to it by the Owner/User of a Pressure Vessel or ~~Boiler~~Boiler, the Board may, when the public interest and convenience require, extend the time for the making of such inspection for a period not to exceed six months as the Board may determine.
 - (b) Air Tanks. All air tanks and their Appurtenances, except those specified in M.G.L. c. 146, § 34 ~~and 522 CMR 5.00~~, shall be thoroughly inspected externally and internally at least once every two years when ~~any of~~ the following criteria are met: ~~-(a) design~~

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MAWP greater than 50 PSI; (b) greater than six inches internal diameter; ~~and~~ (c) internal volume greater than one cubic foot.

(c) Massachusetts Tag Number.

1. Every Boiler, Pressure Vessel, and Refrigeration System or air conditioning system which has been inspected by the Division shall be given a serial number upon a non-ferrous metal tag authorized by the Board. The tag shall be held by non-ferrous wire in a conspicuous place on the unit and no person except a District Engineering Inspector shall remove the tag.
2. Authorized insurance companies shall be furnished tag numbers by the Chief for Refrigeration Systems or air conditioning systems or hot water Boiler systems. The authorized insurance companies shall furnish tags, authorized by the Board, upon which shall be the tag number. The tag shall be made of non-ferrous metal and attached in a conspicuous place on the unit.

1.05: Variance Procedure

- (1) Application. An Owner/User, or an Engineer in Charge may apply ~~to~~ to the ChiefBoard for a variance from 522 CMR. In order for the ChiefBoard to approve a variance, the applicant must demonstrate that such ~~a variance~~ approval would not compromise public safety or otherwise undermine the purpose of 522 CMR. Application for a variance shall be made on a form approved by the Board for this purpose with supporting documentation, and shall be signed by the applicant.
- (2) Upon receipt of an application for variance, the ChiefBoard shall review the ~~request~~ application with supporting documentation. ~~and~~ The Board may either:
 - (a) Grant the variance as requested or with conditions that the ChiefBoard deems appropriate;
 - (b) Deny the variance request;
 - (c) Request additional information/clarification from the applicant; or
 - (d) Commence an adjudicatory hearing to further review the variance request. Hearings will be held in accordance with the provisions of M.G.L. c. 30A and 801 CMR 1.02.

~~(a) Commence an adjudicatory hearing before the Board to further review the variance request. Hearings will be held in accordance with the provisions of M.G.L. c. 30A and 801 CMR 1.02.~~
- (3) Appeals. Any person aggrieved by the ChiefBoard's decision ~~made without a hearing~~ made after an adjudicatory hearing may appeal to the Superior Court in accordance with M.G.L. c. 30A, § 14. ~~may file a request for an adjudicatory hearing with the Board. All adjudicatory hearings will be held by the Board in accordance with the provisions of M.G.L. c. 30A and 801 CMR 1.02 and shall be final. Any party aggrieved by a final decision made subsequent to the appeal hearing may file an appeal with the Superior Court pursuant to M.G.L. c. 30A, §14.~~

1.06: Inspection Extension Request Procedure

Application. Pursuant to M.G.L. c. 146, § 6, an Owner/User or ~~an~~ Engineer in Charge -may apply to the ~~Board~~Chief for an extension of a Certificate, prior to said Certificate expiration. ~~Certificate extension to the period in which an annual inspection must be completed. Such period shall not exceed six months.~~

(1) Application for an inspection extension shall be made on a form approved by the Board for this purpose, shall be signed by the applicant, and shall include a letter from an Authorized Inspector or, if not insured, a letter from a District Engineering Inspector. The letter shall provide guidance to the ~~Board~~Chief on the condition of the ~~Boiler~~Boiler.

(2) ~~Board Action.~~ Upon receipt of an application, the ~~Board~~Chief shall review the request as soon as practicable and make a decision to either:

- (a) Grant the extension as requested;
- (b) Grant the extension with conditions;
- (c) Deny the extension request; or
~~Request additional information.~~
- (d) Commence an adjudicatory hearing to further review the extension request.
Hearings will be held in accordance with the provisions of M.G.L. c. 30A and 801
CMR 1.02.

(3) Any person aggrieved by the Chief's decision may file a request for review by the Board.

(4) Board Action. Upon receipt of an appeal, the Board shall review the request as soon as practicable and make a decision to either:

- (a) Grant the extension as requested;
- (b) Grant the extension with conditions;
- (c) Deny the extension request;
- (d) Request additional information; or
- (e) Commence an adjudicatory hearing to further review the extension request.
Hearings will be held in accordance with the provisions of M.G.L. c. 30A and 801
CMR 1.02.

Appeals. Any person aggrieved by the Board's decision made without a hearing may file a request for an adjudicatory hearing with the Board. All adjudicatory hearings will be held in accordance with the provisions of M.G.L. c. 30A and 801 CMR 1.02 and be final.

~~Any party aggrieved by a final decision made subsequent to the appeal hearing may file an appeal with the Superior Court pursuant to M.G.L. c. 30A, §14.~~

~~(5) Any person aggrieved by the Board's decision made after an adjudicatory hearing may appeal to the Superior Court in accordance with M.G.L. c. 30A, § 14.~~

~~(6) All petitions and inquiries to the Board shall be submitted in writing.~~

1.07: Decommissioning

~~Whenever a Boiler or Pressure Vessel is determined to be detrimental to public safety by either a District Engineering Inspector or Authorized Inspector, said Boiler or Pressure Vessel shall be Decommissioned. The Authorized Inspector or District Engineering Inspector shall remove the Certificate of the unsafe or dangerous Boiler or Pressure Vessel. The Authorized Inspector shall notify the Chief within 14 days after the Decommissioning of the Boiler or Pressure Vessel, on a form approved by the Chief, the name of the Owner/User, location where the Boiler or Pressure Vessel was Decommissioned, and the Mass Tag number of the Decommissioned Boiler or Pressure Vessel.~~

522 CMR 2:00: POWER BOILERS

2.01: Scope and Application

~~In accordance with the provisions of M.G.L. c. 146, § 2, the Board herewith adopts by reference the ASME ~~Boiler~~Boiler and Pressure Vessel Code Section I, Rules for Construction of Power ~~Boiler~~Boilers.~~

~~This ASME code is on file with the State Secretary.~~

2.02: Records

To ~~insure~~ ensure the proper daily inspection of steam ~~boiler~~Boilers, the following shall apply:

~~(1) All Engineer's and Firemen in charge of steam boiler(s) and/or engines shall notify the Department in writing the location of the boilers and/or engines in which they are in charge of. When accepting or leaving a position as an engineer or fireman in charge, the engineer or fireman have seven calendar days to notify the department.~~

~~(12) When an engineer or fireman states that he is "in charge" of they are is "operating" steam boilerBoilers or steam engines, it is understood that he/she is in actual authority as the "engineer in charge," and is held responsible by the owners as well as by the proper authorities for the daily operation and maintenance of the steam boilers or engines specified; also that all persons operating these boilers or engines do so under the direct authority of the "engineer in charge". In order to effectively perform his/her duties, the engineer in charge must make daily visits to the plant. It is expected that people performing the duties as the engineer in charge will leave daily instructions to the operating personnel, and that those instructions shall be made available to the inspectors of the department upon request. The engineer in charge shall sign the Engineer's Record Book, as provided for in M.G.L. c. 146, § 51, on a daily basis. It is reasonable for the~~

~~engineer in charge to perform his duties at the facility five days and to give written instructions to the personnel during the designated weekends.~~

~~(3) When an engineer or fireman state that he/she is "operating" steam boilers or steam engines, it is understood that during that time stated,~~ they are actually engaged as an assistant to the person "in charge", and during ~~his/her~~their hours on duty, ~~is they are~~ held responsible ~~by the person in charge as well as by the proper authorities~~ for the proper operation of the ~~boiler~~Boilers and engines specified; and their appurtenances. Operators of steam ~~boiler~~Boilers shall complete and sign the Operator's Record Book, as provided for in M.G.L. c. 146, § 46A, on a daily basis. These records shall be made available to the ~~Inspectors of the Department of Public Safety~~District Engineering Inspector upon request.

~~(42) In the event an accident or incident in which a steam boiler or its appurtenances are involved of a Reportable Accident/Incident, the Owner/User or the Engineer in Charge shall notify the Massachusetts Emergency Management Agency at 508-820-1444 within 24 hours of the event. , the Department of Public Safety must be notified within 24 hours of the accident/incident. In the event of a fatality, the scene of the accident must not be disturbed except for the removal of the dead or injured persons until approval is granted by an inspector of the Division. Only accidents of incidents that require hospitalization or resulting in damage exceeding \$10,000 per incident, must be reported. Such accidents and incidents shall be reported to the Department at 1-800-223-0933, during normal working hours, or to the State Police at 1-617-727-2919 during off hours or weekends.~~

~~(3) All Engineers and Firemen in charge of steam boilerBoilers and/or engines shall notify the Department in writing, within seven days of their appointment, of the location of the boilerBoilers and/or engines of which they are in charge. When accepting or leaving a position as an Engineer or fFireman in charge, the eEngineer or fFireman has seven calendar days toshall notify the Department within seven days.~~

~~(4) The Engineer in Charge is inthe actual authority for the daily operation-and, maintenance and repair of the steam-boilerBoilers, Pressure Vessels, -or engines and their Appurtenances specified. All persons operating, repairing or maintaining these Boilers, Pressure Vessels, engines and their Appurtenances boilers or engines do so under the direct authority of the Engineer in Charge. In order to effectively perform their duties, the Engineer in Charge shall make daily visits to the plant. Individuals performing duties as the Engineer in Charge will leave daily written instructions to the operating personnel and those instructions will be made available to the District Engineering Inspector upon request. The Engineer in Charge shall sign the Engineer's Record Book, as provided for in M.G.L. c. 146 §- 51, on a daily basis and shall review the Operator's Log Book on a daily basis. It is reasonable for the Engineer in Charge to perform their duties at the facility five working days per weekand to give written instructions to the personnel during the designated weekends.~~

2.03: Construction

(1) Heat Recovery Steam Generators (HRSG's). All heat recovery steam generators built after May 1, 2000, shall be built to the ASME BoilerBoiler and Pressure Vessel Code Section I, Rules

for Construction of Power ~~Boiler~~Boilers adopted at the time of installation.

(2) Restrictions, Dual Pressure Controls, Bypass Switches.

(a) ~~(a)~~ Steam ~~boiler~~Boilers under this section are prohibited from having any device that enables the ~~boiler~~Boiler to operate at a pressure less than ten percent of its normal operating pressure. Dual pressure controls or any similar device are prohibited from use on all steam ~~boiler~~Boilers operating above 15 PSIG.

(b) Manual devices and switches that allow the bypass of any safety control are prohibited unless such device or switch is provided with a “dead-man” capability that ensures that the Operator is present and responsible when the device or switch is in use. No such device or switch shall have the capability to fail in the closed position.

(3) Remote Monitoring Systems. ~~—When remote monitoring systems on Steam Boiler plants are in use, they shall monitor, but not be limited to: steam pressure, water level, and remote shut down. Steam Boiler plants seeking to utilize remote monitoring systems must be designed in accordance to the Department’s policy statement on remote monitoring systems. Applications and plans shall be submitted to the Chief for approval. Remote monitoring systems shall be inspected by a District Engineering Inspector prior to operation. A Certificate of approval shall be issued upon the successful completion of the inspection. Steam boiler plants seeking to utilize remote monitoring systems must be configured in a manner that enables the Operator to see the remote monitoring device at all times. Such devices shall include, but not be limited to: pressure gauge/indicators, remote water level indicator, audible alarm(s), and an emergency shutdown switch.~~

2.04: ~~Reconstruction including~~ Welded Repairs, Major Repairs, Alterations

~~—All reconstruction including~~ Repairs and Alterations performed to the High Pressure/Power Boiler and the High Pressure/Power Boiler proper ~~bring the boiler to the original code of construction,~~ as stamped on the ~~boiler,~~ shall be done in accordance with the provisions of M.G.L. c. 146, § 2 and NBIC Part 3-. It is the responsibility of the Owner/User or Engineer in Charge to ensure that ~~any reconstruction~~all repairs and alterations are ~~is~~ performed in accordance with this regulation.

2.05: Installation

In accordance with the provisions of M.G.L. c. 146, § 2, the Board herewith adopts ~~the~~ NBIC Part 1.

2.06: Inspection

In accordance with the provisions of M.G.L. c. 146, § 2, the Board herewith adopts NBIC Part 2.

(1) Application.

Whoever owns or uses or causes to be used a ~~power boiler~~High Pressure/Power Boiler that comes within the scope of M.G.L. c. 146, § 6, shall make application for inspection prior to operation to the Chief in a format approved by the Department. ~~The Owner/User shall give their name and address and the location of the boiler, the designated Engineer in Charge, and any other information required by the Department.~~

(2) Field Inspection.

All ~~power boiler~~High Pressure/Power Boilers shall be thoroughly inspected internally and externally while under pressure at least once annually in accordance with the NBIC. ~~The annual external inspection shall be within six months after the annual internal inspection.~~ A District Engineering Inspector shall perform the First Inspection as required by M.G.L. c. 146, § 6. Subsequent annual inspections shall be performed by a District Engineering Inspector or an Authorized Inspector. A thorough Internal Inspection requires the following:

- (c) Each space, including but not limited to, fireside and waterside spaces provided with a handhole, manhole, or other points of access such as doorways and openings into fireside and waterside spaces shall be opened and cleaned for a visual inspection.
- (d) Pre-inspection and post-inspection activities as -provided for in the NBIC shall be performed.

(3) Certificate to be Posted.

The Department shall issue to the Owner/User of a Boiler compliant with 522 CMR a Certificate, provided the appropriate fees have been paid. The Certificate shall be protected from dirt, moisture, and contamination and shall be posted in a conspicuous place near where the Boiler specified therein is located and shall be kept with said Boiler and shall be always accessible to the District Engineering Inspector or Authorized Inspector. ~~If the boiler is found to comply with 522 CMR, the Department shall issue to the Owner/User of said boiler a Certificate, provided the appropriate fees have been paid. Pursuant to M.G.L. c. 146, § 8, the Certificate for a power boiler shall be protected from dirt, moisture, and contamination and shall be posted in a conspicuous place near where the boiler specified therein is located. The Certificate for a portable boiler shall be kept with said boiler and shall be always accessible to the District Engineering Inspector or Authorized Inspector.~~

The Certificate shall include the name of the insurance company, the National Board number, the Mass tag number, the name of the manufacturer, model number as well as the following in accordance with M.G.L. c. 146, § 27: ~~-the name of the Owner/User; -the location, size, pounds per hour of steam and pressure or BTU per hour output, fuel, and number of the boiler;~~ the date of inspection and the maximum pressure at which the ~~boiler~~Boiler may be operated; the expiration date; and the name and signature of the District Engineering Inspector or Authorized Inspector.

The Certificate shall remain posted while the Certificate is in force, unless a District Engineering Inspector or an Authorized Inspector deems the ~~boiler~~Boiler or its Appurtenances unsafe or dangerous. -If a ~~boiler~~Boiler is determined to be unsafe or dangerous, the District Engineering Inspector or Authorized Inspector shall remove the Certificate and the ~~boiler~~Boiler or Pressure Vessel shall not be operated until such time that a valid Certificate is issued.

(4) Preparation of Inspection.

The ~~boiler~~Boiler shall be prepared for inspection in accordance with the NBIC. -The Engineer in Charge is responsible to ensure the ~~boiler~~Boiler is properly prepared for inspection.

(5) Inspection Reporting.

~~Whoever owns or uses or causes to be used any boiler requiring inspection pursuant to M.G.L. c. 146, § 6, that person shall report to the Chief the location of such boiler the boiler is to be operated. Inspection reports shall be submitted to the Department in a format approved by the Department.~~Pursuant to M.G.L. c. 146, § 10, whoever owns, or uses or causes to be used, any such Boiler, unless the same is under the periodically guaranteed inspection of an insurance company authorized to insure Boilers in the commonwealth, shall report in writing to the Chief the location of such Boiler, before the work of installation of such Boiler is completed, and annually thereafter; provided, that the owner or user of an insured Boiler shall report immediately in writing to the Chief whenever the insurance company ceases for any cause to inspect the Boiler.

(6) Reporting by Insurance Companies.

Pursuant to M.G.L. c. 146, § 77, Every insurance company shall forward to the Chief, within 14 days after each inspection, reports of all Boilers inspected by the Authorized Inspectors. Such reports shall be made on a form approved by the Chief and shall contain all orders made by the company regarding such boilers.~~Every insurance company shall forward to the Chief, within 14 days after each inspection, reports of all boilers inspected by Authorized Inspectors. Such reports shall be made on forms approved by the Chief and shall contain all orders made by the company regarding such systems.~~

All insurance companies shall notify the Chief, within 14 days, on the appropriate NBIC form, approved by the Chief, of all ~~boiler~~Boiler new business or discontinuation of business. All insurance companies shall report immediately to the Chief the name of the Owner/User and the location of every ~~boiler~~Boiler required to be inspected by M.G.L. c. 146, § 70, upon which they have cancelled or refused insurance, giving the reasons therefor.

(7) Boiler Horsepower.

When liquid or gaseous fuel, electric or atomic energy or any other source of heat is used the horsepower of a Boiler shall be determined by either the manufacturer's factory tag affixed to the Boiler or burner denoting horsepower, or by calculated by one of the

following formulae: the steam output capacity as listed on the manufacturer's tag divided by 34.5, the BTU/hr input listed on the manufacturer's tag divided by 41,840 or the BTU/hr output listed on the manufacturer's tag divided by 33,475.

If a tag is missing, damaged or unclear, the licensed Engineer-in-Charge or on duty at the time shall notify the Owner/User of the steam Boiler. The Owner/User shall obtain a notarized letter, signed by an officer of the manufacturer of the Boiler or burner, listing the maximum capacity of the steam Boiler in BTU/hr. Such letter shall be an acceptable basis for calculating the horsepower of that particular steam Boiler.

The minimum safety valve relieving capacity shall be determined in accordance with the ASME Code.

2.07: General Requirements

(1) Pressure Tests.

~~(a)~~ When there is doubt as to the extent of a defect of detrimental condition found in a **Pressure Vessel/High Pressure/Power Boiler**, the District Engineering Inspector or the Authorized Inspector may require a pressure test at any time. Such tests shall be performed in accordance with the NBIC and the Engineer in Charge shall notify the District Engineering Inspector.

~~(b) When the contents of the vessel prohibit contamination by any other medium or when a hydrostatic test is not possible, other testing media may be required by the District Engineering Inspector or Authorized Inspector provided that the precautionary requirements in the NBIC are adhered to.~~

2.03: Miscellaneous Provisions

~~(1) Safety valves as defined in the ASME code section I, shall be the only device accepted to limit the pressure carried by a boiler. Other devices may be used in supplement to this device, to control operating pressure but shall not be used as the recognized device limiting the pressure.~~

~~(2) Safety Valve Relieving Capacity. The minimum safety valve relieving capacity for other than~~

electric boilers, waste heat boilers, and forced flow steam generators with no fixed steam and waterline, shall be determined on the basis of pounds of steam generated per hour per square foot of boiler heating surface and waterwall heating surface as given in 522 CMR 2.03(2): *Table 1*.

In many cases, a greater safety valve relieving capacity will have to be provided than that estimated in 522 CMR 2.03(2): *Table 1*, in order to meet the requirements of ASME Section I, PG-67.2.

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~~TABLE 1~~
~~MINIMUM POUNDS OF STEAM PER HOUR~~
~~PER SQUARE FOOT OF HEATING SURFACE~~

-

~~Firetube Boilers~~ ~~Watertube Boilers~~

~~Boiler Heating Surface~~

~~Hand fired~~ ~~5~~ ~~6~~
~~Stoker fired~~ ~~7~~ ~~8~~
~~Oil, gas, or pulverized~~
~~fuel fired~~ ~~8~~ ~~10~~
~~Single pass fire tube~~ ~~12~~

-

~~Waterwall Heating Surface~~

~~Hand fired~~ ~~8~~ ~~8~~
~~Stoker fired~~ ~~10~~ ~~12~~
~~Oil, gas or pulverized~~
~~fuel fired~~ ~~14~~ ~~16~~

-

The safety valve capacity for each boiler, except as that noted above, shall be such that the safety valve or valves will discharge all the steam that can be generated by the boiler without allowing the pressure to rise more than 6% above the highest pressure at which any valve is set and in no case to more than 6% above the maximum allowable working pressure. The safety valve capacity shall be in compliance with 522 CMR 2.03(2): *Table 1*.

(3) Maximum Designed Steaming Capacity. The maximum designed steaming capacity shall be no less than the following:

(a) By measuring the maximum amount of fuel that can be burned. The weight of steam generated per hour is found by the formula:

$$W = \frac{C \times H \times .75}{1100}$$

-

—where

-

~~W = weight of steam generated / hour, lb~~
~~C = total weight or volume of fuel burned / hour at~~
~~time of maximum forcing, lb or cu. Ft.~~
~~H = heat of combustion of fuel, Btu/lb or Btu-/~~
~~cubic foot (See 522 CMR 2.03(3): Table 2)~~

~~The sum of the safety valve capacities marked on the valves shall be equal to or greater than W.~~

~~(b) By determining the pounds of steam generated per hour per square foot of heating surface, as given in 522 CMR 2.03(2): Table 1. In many cases, a greater safety valve relieving capacity will have to be provided than that estimated in 522 CMR 2.03(2): Table 1, in order to meet the requirements of ASME Section I, PG 67.2.~~

~~TABLE 2~~
~~BTU VALUES FOR FUELS~~

Fuels	H = Btu/lb
Semibituminous coal	14,500
Anthracite	13,700
Screenings	12,500
Coke	13,500
Wood, hard or soft, kiln dried	7,700
Wood, hard or soft, air dried	6,200
Wood shavings	6,400
Peat, air dried, 25% moisture	7,500
Lignite	10,000
Kerosene	20,000
Petroleum, crude oil, Pennsylvania	20,700
Petroleum, crude oil, Texas	18,500
MSW / RDF (prepared trash)	4,500

	H = Btu/cu ft
Natural gas	960
Blast furnace gas	100
Producer gas	150
Water gas, uncarbureted	290

~~(4) Water Columns. For boilers not exceeding 200 p.s.i., with single gauge glass connections, all water columns shall be constructed with a minimum of three try cocks to provide a safe means for determining the boiler water level if the gauge glass is removed from service.~~

~~(5) Pressure Tests.~~

~~(a) When there is doubt as to the extent of a defect of detrimental condition found in a pressure vessel, the Inspector may require a pressure test. A pressure test normally need not be made as part of a periodic inspection. However, a test shall be made when unusual, hard to evaluate forms of deterioration possibly affecting the safety of a vessel are disclosed by inspection and also after certain repairs.~~

~~(b) To determine tightness, the test pressure need be no greater than the set pressure of the safety valve having the lowest setting.~~

~~(c) The pressure test shall not exceed 1 1/2 times the maximum allowable working pressure.~~

~~(d) During a pressure test, where the test pressure will exceed the set pressure of the safety valve having the lowest setting, the safety relief valve or valves shall be removed or each valve disk be held down by means of a test clamp and not by applying additional load to the valve spring by turning the compression screw.~~

~~(e) The minimum temperature of the water used to apply a hydrostatic test shall not be less than 70° F unless the owner provides information on the brittle characteristics of the vessel material to indicate the acceptability of a lower test temperature. The maximum temperature is not to be more than 120° F unless the owner specifies a temperature higher than 120° F, the pressure shall be reduced to the MAWP and the temperature to 120° F for close inspection.~~

~~(f) When the contents of the vessel prohibit contamination by any other medium or when a hydrostatic test is not possible, other testing media may be used providing the precautionary requirements are adhered to. In such cases, there shall be agreement as to the testing procedure between the owner and the Inspector.~~

~~(6) Heat Recovery Steam Generators (HRSG's). All heat recovery steam generators built after May 1, 2000 shall be built to the code as indicated in 522 CMR 2.01.~~

~~(7) Restrictions, Dual Pressure Controls, Bypass Switches:~~

~~(a) Steam boilers under this section are prohibited from having any device that enables the boiler to operate at a pressure less than 10% of its normal operating pressure. Dual pressure controls or any similar device are prohibited from use on all steam boilers operating above 15 PSIG.~~

~~(b) Manual devices and switches that allow the bypass of any safety control, are prohibited unless such device or switch is provided with a "dead-man" capability that ensures that the operator is present and responsible when the device or switch is in use. No such device or switch shall have the capability to fail in the closed position.~~

522 CMR 3.00: POWER REACTIONR VESSELS AND& PIPING AND& UNFIRED PRESSURE VESSELS AS USED IN ATOMIC ENERGY INSTALLATIONS

3.01: Scope and Application

522 CMR 3.00 applies to all nuclear power reactor vessels and piping as well as unfired vessels used in atomic energy installations.~~(4) In accordance with the provisions of M.G.L. c. 146, § 2,~~
~~the Board of Boiler Rules herewith adopts by reference RULES FOR CONSTRUCTION OF NUCLEAR VESSELS, 1998 Edition, with 1999 addenda, formulated and published by the American Society of Mechanical Engineers, as A.S.M.E. NUCLEAR VESSELS, SECTION III,~~

~~RULES FOR CONSTRUCTION OF NUCLEAR VESSELS.~~

~~(2) 522 CMR 3.00 shall be applicable to the construction, installation and inspection of steam boilers, power reactor vessels, containment vessels, piping, reactor plant appurtenances and unfired pressure vessels as used in atomic energy installations subject to the provisions of M.G.L. c. 146.~~

3.02: Construction

(1) In accordance with the provisions of M.G.L. c. 146, § 2, the Board herewith adopts by reference the ASME ~~Boiler~~Boiler and Pressure Vessel Code Section III, Rules for the Construction of Nuclear Facility Components.

(2) 522 CMR 3.00 shall be applicable to the construction, installation and inspection of steam ~~boiler~~Boilers, power reactor vessels, containment vessels, piping, reactor plant Appurtenances and unfired Pressure Vessels as used in atomic energy installations subject to the provisions of M.G.L. c. 146.

3.03: Installation

In accordance with the provisions of M.G.L. c. 146, § 2, the Board herewith adopts ~~the~~-NBIC Part 1.

3.04: Inspection, Repairs, and Alterations

In accordance with the provisions of M.G.L. c. 146, § 2, the Board herewith adopts the ASME ~~Boiler~~Boiler and Pressure Vessel Code Section XI - Division 1, Rules for Inservice Inspection of Nuclear Power Plant Components, in addition to the -NBIC Part 2 and Part 3.

3.025: Inspector and Records

(1) An ~~appropriate national board commissioned inspector~~Authorized Nuclear Inspector and Authorized Nuclear Inspector (Concrete) shall be on the site during the mechanical construction and testing phases of every nuclear reactor installation, its components, appurtenances, containment vessel and piping systems. ~~The District Engineering Inspector may, from time to time, make such inspections as deemed appropriate.~~

(2) ~~The Owner/User shall keep P~~permanent records ~~shall be kept~~to maintain complete traceability of all material used in the construction of any nuclear reactor plant. These records shall include certificates of chemical and physical properties.

(a) Permanent records shall be kept at the plant site to maintain complete traceability of all welds that fall within the limits of Section III of the current edition of the A.S.M.E. Code that has been accepted and approved by the Board ~~of Boiler Rules~~ and the Commonwealth ~~of Massachusetts~~.

(b) Permanent records shall be maintained identifying all welders, and their qualifications, performing welds covered in 522 CMR 3.025(2)(a).

3.036: Miscellaneous Provisions

(1) The owner of a nuclear power plant shall provide a procedure by which all agency reports and data sheets shall be coordinated to the satisfaction of the ~~Department of Public Safety of the Commonwealth of Massachusetts~~ Chief or his designee.

~~(2) The Engineering Section of the Department of Public Safety may, from time to time, make such inspection as it deems appropriate.~~

~~(32)~~ Pressure Tests.

(a) ~~An Authorized Nuclear Inspector may require a pressure test to determine the extent of a defect of detrimental condition found in a Pressure Vessel. When there is doubt as to the extent of a defect of detrimental condition found in a pPressure vVessel, the Authorized Nuclear Inspector may require a pressure test.~~ Such test shall be performed in accordance with the NBIC and ASME Nuclear Vessels, Section III, Rules for the Construction of Nuclear Vessels. A pressure test normally need not be made as part of a periodic inspection. However, a test shall be made when unusual, hard to evaluate forms of deterioration possibly affecting the safety of a vessel are disclosed by inspection and also after certain repairs.

~~(b) To determine tightness, the test pressure need be no greater than the set pressure of the safety valve having the lowest setting.~~

~~(c) The pressure test shall not exceed 1 1/2 times the maximum allowable working pressure.~~

~~(d) During a pressure test, where the test pressure will exceed the set pressure of the safety valve having the lowest setting, the safety relief valve or valves shall be removed or each valve disk be held down by means of a test clamp and not by applying additional load to the valve spring by turning the compression screw.~~

~~(e) The minimum temperature of the water used to apply a hydrostatic test shall not be less than 70° F unless the owner provides information on the brittle characteristics of the vessel material to indicate the acceptability of a lower test temperature. The maximum metal temperature is not to be more than 120° F unless the owner Authorized Nuclear Inspector agrees to specifies a temperature higher than 120° F, the pressure shall be reduced to the MAWP and the temperature to 120° F for close inspection.~~

~~(f) When the contents of the vessel prohibit contamination by any other medium or when a hydrostatic test is not possible, other testing media may be required by the Authorized Nuclear Inspector provided that used providing the precautionary requirements in the NBIC are adhered to. In such cases, there shall be agreement as to the testing procedure between the owner and the Inspector.~~

CHAPTER 522 CMR 4.00: STEAM AND HOT WATER HEATING BOILERS AND OTHER HEAT STORAGE SOURCES

4.01: Scope and Effectiveness Application

~~(1) 522 CMR 4.00 shall apply to boilers used for steam generation, hot water heating boilers, hot water supply boilers or for heating liquids used as a heat storage source as follows:~~

~~(a) Steam Power Boilers. Over 3 H.P. constructed for pressures in excess of 15 p.s.i.~~

~~(b) Hot Water Heating Boilers. Exceeding 30 p.s.i.g. operating pressure; or 250°F operating temperature.~~

~~(c) Hot Water Supply Boilers and Other Liquid Heat Storage Sources When Any of the Following Are Exceeded.~~

~~1. 160 pounds p.s.i.~~

2. 250° F operating temperature.

(21) In accordance with the provisions of M.G.L. c. 146, § 2, the Board of ~~Boiler Rules~~ herewith adopts ~~by reference the 1998 A.S.M.E. ASME Boiler~~ and Pressure Vessel Code Section IV, Rules for Construction of Heating ~~Boiler~~Boilers. This ASME code is on file with the State Secretary. ~~Power Boilers and Section IV, Heating Boilers, with 1999 addenda, together with 522 CMR 4.00 shall be the rules for construction and installation of boilers coming within the scope of 522 CMR 4.01(1)(a), 4.01(1)(b), and 4.01(1)(c) and the construction and installation of such boilers shall conform thereto. All applicable sections of the A.S.M.E. Code are filed with the Secretary of the Commonwealth.~~

(2) Requirements. 522 CMR 4.00 shall apply to ~~boiler~~Boilers exceeding 3 HP and restricted to the following services:

(a) steam ~~heating boiler~~Low Pressure/Heating Boilers having a minimum safety relief valve capacity greater than 103.5 pounds per hour for operation ~~having a capacity of more than 207 pounds of steam per hour output and~~ at pressures not exceeding 15 psig (100 kPa).

(b) hot water ~~heating boiler~~Low Pressure/Heating Boilers and hot water supply ~~boiler~~Boilers having a minimum safety relief valve capacity greater than 100,425 Btu's per hour for operation at pressures not exceeding 160 psig (1100kPa).

(c) hot water ~~heating boiler~~Low Pressure/Heating Boilers and hot water supply ~~boiler~~Boilers having a minimum safety relief valve capacity greater than 100,425 Btu's per hour for operation at temperatures not exceeding 250°F (120°C), at or near the ~~boiler~~Boiler outlet, except that when some of the wrought materials permitted by ASME Code Section IV are used, a lower temperature is specified.

(d) potable ~~water heating boiler~~ water heaters and water storage tanks for operation at pressures not exceeding 160 psig (1100kPa) and water temperatures not exceeding 210°F (99°C). 522 CMR 4.01 (2)(d) shall not apply to units in this category when none of the following limitations are exceeded:

1. Heat input of 200,000 Btu/hr;
2. A water temperature of 210°F (99°C);
3. A nominal water-containing capacity of 120 gallons, except that they shall be equipped with safety devices in accordance with the requirements of paragraph HLW-100 of ASME Section IV.

The minimum safety valve relieving capacity for Low Pressure/Heating Boilers and other heat storage sources shall be determined in accordance with ASME Section IV.

For services exceeding these limits, the rules of ASME Section I Code and 522 CMR 16.00 apply.

BoilerBoilers within the scope of 522 CMR 4.00 which were legally operating in the Commonwealth prior to the publication of 522 CMR 4.00 with the Secretary of the

Commonwealth and which conformed to the existing installation rules may continue in such service.

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~~All boilers within the scope of 522 CMR 4.01(1)(a), 4.01(1)(b), and 4.01(1)(c) except Cast Iron, Mass. Std., and Mass. Heat Boilers shall be stamped N.B. and data reports shall be registered with the National Board.~~

~~Boilers within the scope of 522 CMR 4.01(1)(a), 4.01(1)(b), and 4.01(1)(c) which were operated in the Commonwealth prior to the publication of 522 CMR 4.00 with the Secretary of the Commonwealth and which conform to the Existing Installation Rules hereafter established may be continued in such service.~~

~~The rules for the installation and appurtenances shall apply to a relocated boiler to the extent permitted by the design and construction of the boiler. All rules and parts of rules inconsistent herewith are hereby repealed.~~

4.02: Definitions

Authorized Inspector:

~~(a) A district engineering inspector employed by the Division of Inspection, Department of Public Safety, Commonwealth of Massachusetts, or~~

~~(b) A boiler inspector holding a Certificate of Competency as a boiler inspector, issued him by the Division of Inspection to field inspect boilers within the Commonwealth or make shop inspections in the shop of an authorized manufacturer while employed by an authorized insurance company, or~~

~~(c) A boiler inspector employed by a authorized insurance company who holds a current commission issued him by the National Board, or such other inspectors holding National Board Commissions as are approved by the Chief of Inspections.~~

~~NOTE: Field inspections of boilers in Massachusetts may be made only by district engineering inspectors in the employ of, or holders of Certificates of Competency issued by the Department of Public Safety of the Commonwealth of Massachusetts.~~

~~Authorized Manufacturer. A boiler manufacturer who has registered with the Board of Boiler Rules and has been authorized by the Board to build steel plate boilers for use in Massachusetts. The boiler manufacturer shall hold the appropriate ASME Code stamp or Massachusetts Standard and shall hold a valid certificate of authorization.~~

~~Massachusetts Heat Boiler. A steel plate boiler built by an authorized manufacturer in accordance with Section IV of the A.S.M.E. Code but not stamped with the Code symbol.~~

~~National Board. The National Board of Boiler and Pressure Vessel Inspectors with headquarters~~

~~in Columbus, Ohio.~~

4.02: Construction

All ~~heating boiler~~Low Pressure/Heating Boilers under the scope of this section shall be initially constructed in accordance with the Section IV of the ASME ~~Boiler~~Boiler and Pressure Vessel Code.

4.03: Reconstruction including Welded Repairs, Major Repairs, Alterations

~~————~~All reconstruction including Repairs and Alterations performed to bring the vessel to the original code of construction, as stamped on the ~~boiler~~Boiler, shall be done in accordance with the provisions of M.G.L. c. 146, § 2, NBIC Part 3, and Section IV of the ASME ~~Boiler~~Boiler and Pressure Vessel Code.

4.04: Installation

In accordance with the provisions of M.G.L. c. 146, § 2, the Board herewith adopts ~~the~~NBIC Part 1.

~~4.03: General Requirements~~

4.05: Inspection

~~(1) All boilers not complying with 522 CMR 4.03(2) shall be built by an ASME authorized manufacturer.~~

~~(2) Massachusetts Standard and Massachusetts Heat Boilers, Inspection and Stamping, Mass. Std. and Mass. Heat Boilers shall be inspected during construction by an authorized inspector.~~

In accordance with the provisions of M.G.L. c. 146, § 2, the Board herewith adopts ~~the~~NBIC Part 2.

(1) Field Inspection. All hot water ~~heating boiler~~Low Pressure/Heating Boilers and heat storage sources constructed with manholes or hand holes under this section, except those listed as exempt in section 4.05(2), below, shall be thoroughly inspected externally at least once a year:

- (a) ~~Heating boiler~~Low Pressure/Heating Boilers constructed with manholes or hand holes shall be inspected internally at least once every three years;
- (b) Steam ~~heating boiler~~Low Pressure/Heating Boilers constructed with manholes and hand holes shall be inspected internally at least once a year.

The First Inspection for the installation of a water ~~boiler~~Boiler or heat storage source covered by this section may be made by either a District Engineering Inspector or by an Authorized Inspector. The first part of the inspection on steel field erected ~~boiler~~Boilers shall be completed before the system is filled with the fluid to be heated.

The First Inspection for the installation of a steam ~~boiler~~Boiler covered by this section shall be made by a -District Engineering Inspector.

(2) Exempt from Inspection. The following ~~heating boiler~~Low Pressure/Heating Boilers must be constructed in accordance with this regulation, but are exempt from required inspections:

- (a) ~~Boiler~~Boilers of railroad locomotives, motor vehicles or steam fire engines brought into the Commonwealth for temporary use in times of emergency;
- (b) ~~Boiler~~Boilers used in private residences;
- (c) ~~Boiler~~Boilers used for heating purposes which carry pressures not exceeding 15 PSI and have less than 4 square feet of grate surface;
- (d) ~~Boiler~~Boilers of not more than 3 horsepower (~~100,425 BTU~~100,425 Btu/hr) used for heating purposes;
- (e) ~~Boiler~~Boilers under the jurisdiction of the United States Federal Government;
- (f) ~~Boiler~~Boilers used exclusively for horticultural or agricultural purposes.

(3) Certificate to be Posted.

The Department shall issue to the Owner/User of a Boiler compliant with 522 CMR a Certificate, provided the appropriate fees have been paid. The Certificate shall be protected from dirt, moisture, and contamination and shall be posted in a conspicuous place near where the Boiler specified therein is located and shall be kept with said Boiler and shall be always accessible to the District Engineering Inspector or Authorized Inspector. ~~If the boiler is found to comply with 522 CMR, the Department shall issue to the Owner/User of said boiler a Certificate, provided that all of the required fees have been paid. Pursuant to M.G.L. c. 146, § 8, the Certificate for a power boiler shall be protected from dirt, moisture, and contamination and shall be posted in a conspicuous place near where the boiler specified therein is located. The Certificate for a portable boiler shall be kept with said boiler and shall be always accessible to the Authorized Inspector and District Engineering Inspector.~~

The Certificate shall include the name of the insurance company, the National Board number, the Mass tag number, the name of the manufacturer, model number as well as the following in accordance with M.G.L. c. 146 § 27: the name of the Owner/User; the location, size, pounds per hour of steam and pressure or BTU per hour output, fuel, the date of inspection and the maximum pressure at which the Boiler may be operated; the expiration date; and the name and signature of the District Engineering Inspector or Authorized Inspector.

The Certificate shall remain posted while the Certificate is in force, unless a District Engineering Inspector or an Authorized Inspector deems the Boiler or its Appurtenances unsafe or dangerous. If a Boiler is determined to be unsafe or dangerous, the District Engineering Inspector or Authorized Inspector shall remove the Certificate and the Boiler or Pressure Vessel shall not be operated until such time that a valid Certificate is issued. ~~The Certificate shall remain posted while the Certificate is in force, unless an Authorized Inspector or District Engineering Inspector deems the boiler or its Appurtenances unsafe or dangerous. If a boiler is determined to be unsafe or dangerous, the Authorized~~

Inspector or District Engineering Inspector shall remove the Certificate and the boiler or Pressure Vessel shall not be operated until such time that a valid Certificate is issued.

(4) Application.

Whoever owns or uses or causes to be used a ~~heating-boiler~~Low Pressure/Heating Boiler that comes within the scope of M.G.L. c. 146, § 6, shall make application for inspection to the Chief in a format approved by the Department.

(5) Preparation of Inspection.

The Owner/User of a ~~boiler~~Boiler which requires an Internal Inspection by a District Engineering Inspector or an Authorized Inspector shall prepare the ~~boiler~~Boiler for inspection by cooling (blanking off connections to adjacent ~~boiler~~Boilers, if necessary); removing all soot and ashes from tubes, heads, shell, furnace and combustion chamber; drawing off the water; removing the handhole and manhole plates; removing grate bars from internally fired ~~boiler~~Boilers; and removing the steam gauge for testing as well as following Part 2 of the NBIC.

If a ~~boiler~~Boiler has not been properly cooled or otherwise prepared for inspection, the District Engineering Inspector or Authorized Inspector shall decline to inspect the ~~boiler~~Boiler until the ~~boiler~~Boiler has been properly prepared.

(6) Inspection Reporting.

Whoever owns or uses or causes to be used any ~~boiler~~Boiler requiring inspection pursuant to M.G.L. c. 146, § 6, shall report to the Chief the location of such ~~boiler~~Boiler which is to be operated. Inspection reports shall be submitted to the Department in a format approved by the Department.

(7) Reporting by Insurance Companies.

Every insurance company shall forward to the Chief, within 14 days after each inspection, reports of all ~~boiler~~Boilers inspected by Authorized Inspectors. Such reports shall be ~~made~~made in a format approved by the Department and shall contain all orders made by the company regarding such systems.

All insurance companies shall notify the Chief, within 14 days, on the appropriate NBIC form, approved by the Chief, of all ~~boiler~~Boiler new business or discontinuation of business. All insurance companies shall report immediately to the Chief the name of the Owner/User and the location of every ~~boiler~~Boiler required to be inspected by M.G.L. c. 146, upon which they have cancelled or refused insurance, giving the reasons therefore.

The Authorized Inspector shall notify the Chief or his designee immediately if the Authorized Inspector finds that an unsafe and dangerous condition exists resulting in the removal of the Certificate.

(8) Massachusetts Heat ~~Boiler~~Boilers.

Massachusetts Heat ~~Boiler~~Boilers, Inspection and Stamping. Mass. Heat ~~Boiler~~Boilers shall be inspected during construction by a National Board Commissioned Inspector.

Each ~~boiler~~Boiler shall be stamped MASS. HEAT and shall display the following data:

- (a) Manufacturer's name;
- (b) Maximum allowable working pressure;
- (c) Safety valve relieving capacity (minimum) in pounds per hour;
- (d) MASS. HEAT number; and

~~_____~~(e) Year built.

~~Each such boiler shall be stamped MASS. STD. or MASS. HEAT with a MASS. STD. or MASS. HEAT number unless the boiler is a miniature boiler as defined in Section I of the A.S.M.E. Code. When a boiler is a miniature boiler so defined, it shall be stamped MASS. MIN. with a MASS. MIN. number. The stamping of MASS. STD., MASS. HEAT or MASS. MIN. boilers shall also include the following data:~~

- ~~(a) Manufacturer's name;~~
- ~~(b) Year built;~~
- ~~(c) Maximum Allowable Working Pressure;~~
- ~~(d) Safety valve relieving capacity (minimum) pounds per hour.~~

~~A manufacturer's data report shall be filed with the Chief of Inspections, Department of Public Safety, on forms furnished by the Department.~~

(29) Frequency of Inspection. ~~Boilers within the scope of 522 CMR 4.00~~Low Pressure Heating Boiler~~Low Pressure/Heating Boilers~~ constructed with manholes or hand holes shall be inspected as follows:

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(a) Steam ~~Power Boiler~~High Pressure/Power Boilers~~Low Pressure/Heating Boiler.~~ ~~One a~~Annual external inspection and one annual~~which shall include an i~~Internal inspection. ~~The annual external inspection should be made at or about six months after the annual internal inspection except in the case of a boiler that is in service a portion of the year only, in which case the annual external shall be made during such period of service.~~

(b) Hot Water ~~Boiler~~Boilers (Heating, Supply, and Heat Storage Source). Annual external with an internal once each three years where construction permits. ~~The year the internal inspection is made the external inspection may be made at the same time.~~ The External Inspection may be made in conjunction with the Internal Inspection.

(c) Nuclear Vessels and Piping. Section XI, A.S.M.E. Code, shall be used as the guide for determining inspection frequency.

~~(3) Inspection Reports. Inspection reports shall be submitted on forms approved by the Division of Inspection of the Department of Public Safety.~~

~~(4) Preparation for Inspection. The owner or user of a boiler which requires internal inspection by the Division of Inspection of the Department of Public Safety, or by an insurance company, as provided by M.G.L. c. 146, shall prepare the boiler for inspection by cooling (blanking off connections to adjacent boilers, if necessary); removing all soot and ashes from tubes, heads, shell, furnace and combustion chamber; drawing off the water; removing the handhole and manhole plates; removing grate bars from internally fired boilers; and removing the steam gauge for testing.~~

~~If a boiler has not been properly cooled, or otherwise prepared for inspection, the boiler inspector shall decline to inspect it, and he shall not issue a certificate of inspection until satisfactory inspection has been made.~~

~~(5) Certificate of Inspection. The certificate of inspection, as required by M.G.L. c. 146, § 2 shall be that authorized by the Board.~~

~~The certificate of inspection shall be posted in a conspicuous place in the engine or boiler room in which the boiler specified is located; and it shall not be removed therefrom unless the boiler or its appendages become defective, or a new certificate is issued. If in the judgment of the inspector the boiler or its appendages are found to be in a defective or dangerous condition the certificate shall be removed by a district engineering inspector of the Division of Inspection of the Department of Public Safety, or an inspector holding a certificate as an inspector of steam boilers, as provided by M.G.L. c. 146.~~

~~(6) Boilers Removed from the Commonwealth. A boiler which has been used in this Commonwealth and removed therefrom, which does not conform in every detail with the rules of construction formulated by this Board, and has been previously inspected by a district engineering inspector of the Division of Inspection of the Department of Public Safety, or by an inspector of an insurance company authorized to insure steam boilers in this Commonwealth, and has been stamped with a Mass. Serial Number, may be inspected and a certificate of inspection issued if relocated in this Commonwealth.~~

~~(710) Installation of Used BoilerBoilers in the Commonwealth.~~

~~Whoever owns and operates a bBoilerBoiler not in the Commonwealth of Massachusetts which was not shop inspected and stamped in accordance with Section IV of the e-ASME Boiler and Pressure Vessel CodeCode, but bears the stamping of another state or political subdivision which has adopted a standard of construction equivalent to that of Massachusetts, and wishes to operate said steam boilerBoiler within the Commonwealth of Massachusetts, may petition the Chief of Inspections of the Department of Public Safety for permission to do so. Such petition shall be accompanied by the following:~~

- ~~1. a copy of the original data report of the manufacturer of the bBoilerBoiler, signed by the inspector who made the original shop inspectionan inspector~~

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with the appropriate commission who made the original shop inspection;
and;

2. together with the field inspection data sheet and report covering the inspection of the ~~b~~BoilerBoiler, made by a commissioned boiler inspector. Upon receiving this information and if the boiler is found to comply with the Massachusetts rules with regard to material, construction and workmanship, and found to be in safe working condition and equipped with all necessary appendages, the Chief of Inspections shall cause to be issued a certificate of inspection establishing the safe working pressure signed by an inspector with the appropriate commission.

If upon review of this information, the -Chief or his designee finds that the boilerBoiler complies with the Massachusetts requirements with regard to material, construction and workmanship, and further finds that the boilerBoiler is in safe working condition and equipped with all necessary appendages, the Chief or his designee shall cause to be issued a Certificate establishing the safe working pressure.

(11) Boiler Horsepower:

When liquid or gaseous fuel, electric or atomic energy or any other source of heat is used the horsepower of a boiler shall be determined by either the manufacturer's factory tag affixed to the boiler (ASME Code Stamping) or burner denoting horsepower, or by calculated by one of the following formulae: the steam output capacity as listed on the manufacturer's tag divided by 34.5, the BTU/hr input listed on the manufacturer's tag divided by 41,840 or the BTU/hr output listed on the manufacturer's tag divided by 33,475.

If a tag is missing, damaged or unclear, the Owner/User shall obtain a notarized letter, signed by an officer of the manufacturer of the boiler or burner, listing the maximum capacity of the steam boiler in BTU/hr. Such letter shall be an acceptable basis for calculating the horsepower of that particular steam boiler. If the manufacturer is out of business, or is otherwise unable or provide such information, a letter from a registered PE will be acceptable and a new data plate will be affixed to the boiler proper.

The minimum relieving capacity of the pressure relieving device shall be based on the stamping required by the applicable ASME Code.

(1211) Atmospheric BoilerBoilers. BoilerBoilers that are vented directly to the atmosphere, where it is not possible for the boilerBoiler to build up any pressure above atmospheric pressure, shall be exempt from this regulation provided they do not have any valves, flaps, louvers, dampers in the vent line which could have the capacity to freeze in place, thereby causing the boilerBoiler to build pressure. Any atmospheric boilerBoiler that has such valve, flap, louvers, dampers or any Appurtenance that can result in a blockage of the vent line shall be constructed in accordance with the ASME Code as adopted in this section.

(123) Shutdown Switches and Circuit Breakers. A manually operated remote heating plant automatic shutdown device, including but not limited to, a shutdown switch or circuit breaker, shall be located adjacent to the boilerBoiler room door, marked for easy identification. Consideration should also be given to the type and location of the switch to safeguard against tampering. In the event that the boilerBoiler room door is located on the building exterior, the shutdown device shall be located adjacent to the interior of the door. Where entrance may be gained to the boilerBoiler room through two or more separate doors, each door shall be outfitted with a shutdown device adjacent to the door. Alternate locations of remote emergency switch(es) may be approved by the Board through the variance process in 522 CMR 1.04.

~~(8) Welded Repairs, Major Repairs and Alterations. No repairs or alterations shall be done by the welding process without the previous approval of an authorized inspector. If in the opinion of the inspector a hydrostatic test is necessary, such test shall be applied when the work is completed.~~

~~The welded repairs or alterations shall be completed in accordance with the National Board Inspection Code, RULES FOR REPAIR AND ALTERATIONS BY WELDING. In no case shall the repair be required to be made to a higher degree than that to which the boiler was originally constructed.~~

~~When repairs or alterations are performed by the welding process on Nuclear Vessels or Nuclear Piping the requirements of Section XI, A.S.M.E. Code, paragraphs IS300 and IS400 must be accomplished in addition to the above mentioned requirements.~~

~~(9) Stamping of Boilers. Each steel boiler within the scope of 522 CMR 4.00 shall be stamped with a serial number of the Commonwealth of Massachusetts, preceded by the letter "S" for steam boilers and "W" for hot water and other liquid heat storage sources, said letters and figures to be not less than 5/16" in height. The stamping shall not be concealed by lagging or paint and shall be exposed at all times, and shall be as close as practicable to the manufacturer's stamping. Each cast iron boiler and hot water supply boiler within the scope of 522 CMR 4.00 which cannot be stamped directly shall have securely attached to the front of the boiler a noncorrosive metal tag not less than one inch in height, which shall have the serial number stamped thereon. Said number shall remain on the boiler as an identification during the life of the boiler as a pressure vessel.~~

~~(10) Cracks in the Shell or Drum of a Boiler. The shell or drum of a boiler in which a crack is discovered shall be immediately discontinued from service. When cracks cannot be repaired, in the judgment of the authorized inspector, within the scope of the RULES FOR REPAIRS AND ALTERATIONS BY WELDING, a review board will be appointed by the Chief of Inspections to accept or to reject the procedure for repairs to the boiler.~~

522 CMR 5.00: PORTABLE BOILERS~~RESERVED~~

5.01 Scope and Application:

This section applies to all portable boilers brought into the Commonwealth of Massachusetts for temporary use.

(1) The Owner/User of a portable boiler is responsible for ensuring their boiler is in compliance with this regulation.

(2) All portable boilers covered by M.G.L. c. 146 must conform to the construction rules of the ASME Code, Section I and Section IV as applicable.

(3) Any portable boiler brought into the Commonwealth from another jurisdiction shall be inspected as follows:

(a) The First Inspection for all steam boilers must be performed by a District Engineering Inspector and be issued a state number from the Department.

(b) Steam boilers which have previously received a Massachusetts First Inspection and assigned a state number must receive a full Internal Inspection before operation followed by an External Inspection under pressure by a District Engineering Inspector or an Authorized Inspector.

(4) Any portable boiler already in the Commonwealth may be moved to another location within the Commonwealth and issued a Certificate under the following conditions:

(a) Steam boilers have previously received a First Inspection by a District Engineering Inspector and assigned a State boiler number and;

(b) Steam boilers have been internally inspected by an Authorized Inspector or District Engineering Inspector within the past year and;

~~(c) An operational inspection under pressure is conducted by an Authorized Inspector or District Engineering Inspector before the Certificate is issued at that location.~~

~~(5) Hot water heating boilers must receive an External Inspection under pressure at the location of installation before a Certificate may be issued.~~

~~(6) The Certificate is only valid for the location at which the boiler is placed into operation. Once the boiler is moved the Certificate is no longer valid.~~

~~(7) The company is required to notify the Department in a format approved by the Department in advance or as soon as practicable when they are bringing a portable boiler into the Commonwealth or moving a boiler to a new location.~~

~~(8) High Pressure boilers shall be trimmed to meet the following requirements:
The discharge from the blowdown systems (bottom, surface, or LWCOs) must be directed to either a blow down tank on the portable trailer or hard piped to a blow down tank at the location.~~

~~(9) High Pressure boilers must have certification for the boiler external piping as defined in the ASME Section I Code. This could be documented as follows:~~

~~(a) On the boilers National Board Data Report Forms;~~

~~(b) Stamped on the PP Piping;~~

~~(c) On a name plate attached to the boiler or PP Piping; or~~

~~(d) With manufacturers documentation demonstrating that the piping or hoses comply with the maximum pressure and temperature ratings of the boiler.~~

~~(10) Low pressure boiler shall have the blow down systems directed to a point of safe discharge. Discharging directly to the parking lot is not acceptable.~~

~~(11) In cases where the boiler may be set up for multiple controls (high and low pressure operation), only one set of controls may be physically connected to control the burner. All other controls must be physically disconnected and removed. A change of service from High Pressure to Low Pressure or Low Pressure to High Pressure requires a re-inspection and a new Certificate and safety valve will be changed to reflect the proper MAWP.~~

~~(12) Installed boiler controls must be designed for the intended range of operation. High Pressure controls shall not be reset to function as Low Pressure controls.~~

~~(13) Boilers being stored in another jurisdiction shall not be issued a Certificate. The Certificate can only be issued while the boiler is at a specific location connected and ready for use in the Commonwealth.~~

(14) Where required by M.G.L. c. 146 and 522 CMR, the appropriate license for the Engineer in Charge of the portable boiler must be posted on site.

(15) The location of installation should be noted in the inspection form under "location".

522 CMR 6.00: RESERVED

4.04: Existing Installations

(1) Standard **Boilers**. The maximum allowable working pressure of standard **boilers** shall in no case exceed the pressure indicated by the manufacturer's identification stamped or cast on the **boiler** or on a plate secured to it.

(2) Nonstandard **Boilers**, Riveted or Welded. The maximum allowable working pressure that will be allowed on nonstandard riveted or welded **boilers** covered by 522 CMR 4.00, shall be determined in accordance with paragraphs EPV2 & EPV3 of Chapter III, Section III, National Board Inspection Code.

(3) Nonstandard Cast Iron **Boilers**. The maximum allowable working pressure of a nonstandard **boiler** composed principally of cast iron shall not exceed 15 p.s.i.g. for steam service or 30 p.s.i.g. for hot water service or other liquid heat storage source.

The maximum allowable working pressure of a nonstandard **boiler** having a cast iron shell or heads and steel or wrought iron tubes shall not exceed 15 p.s.i.g. for steam service or 30 p.s.i.g. for hot water heating service nor for hot water supply or other liquid heat storage source.

(4) Safety Valves. Each steam **boiler** shall have an A.S.M.E. officially rated safety valve or valves as required by the applicable paragraphs of Section I or IV. Said valves must also bear the National Board approved stamp.

(5) Safety Relief Valves. Each hot water heating **boiler**, hot water supply **boiler** or other liquid heat storage source shall have an A.S.M.E. official rated Safety Relief Valve or Valves as required by the applicable paragraphs of Section I or IV of the A.S.M.E. Code. Said valves must also bear the National Board approval stamp.

(6) Steam Gages. Each steam **boiler** shall have steam pressure gage installed in accordance with the applicable paragraphs of Sections I or IV or the A.S.M.E. Code.

(7) Pressure Gages, Altitude Gages and Thermometers. Each hot water heating **boiler**, hot water supply **boiler** or other liquid heat storage source shall have a pressure gage and a thermometer installed on separate connections to the pressure vessel. Hot water supply **boilers** and other liquid heat storage sources which do not supply hot water or other heat energy at an altitude or more than 20 feet may omit the altitude gage.

(8) Water Gage Glasses. Each steam boiler shall have one or more water gage glasses installed in accordance with the applicable paragraphs of Section I or IV of the A.S.M.E. Code.

(9) Stop Valves and Check Valves. Stop valves and check valves shall be installed as required by the applicable paragraphs of Section I or IV of the A.S.M.E. Code.

(10) Feedwater Connections. Feedwater connections shall comply with the applicable paragraphs of Section I or IV of the A.S.M.E. Code.

(11) Water Equalizer. When two or more boilers are connected together there shall be no water equalizer or other connection below the normal water line through which it would be possible for water to flow from one boiler to the other.

(12) Cracks in the Shell or Drum of a Boiler. The shell or drum of a boiler in which a crack is discovered shall be immediately discontinued from service. When cracks cannot be repaired, in the judgment of the authorized inspector, within the scope the RULES FOR REPAIRS AND ALTERATIONS BY WELDING, a review board will be appointed by the Chief of Inspections to accept or to reject the procedure for repairs to the boiler.

(13) Pipe and Fittings. All pipe fittings and valves shall be as required by the applicable paragraphs of Section I or IV of the A.S.M.E. Code.

(14) Fusible Plugs. Fusible plugs are not recommended for boilers in the above classes. They should only be used where solid fuel is used on grates having a fuel bed. If fusible plugs are used they shall be placed at the lowest safe water line and in contact with the products of combustion. If they are used in cast iron boilers they shall be placed in an accessible point in the combustion chamber.

(15) Repairs and Renewals of Fittings and Appliances. Whenever repairs are made to fittings or appliances, or it becomes necessary to replace them, the repairs must comply with the applicable paragraphs of Sections I or IV of the A.S.M.E. Code for new construction.

(16) Pressure Tests.

(a) When there is doubt as to the extent of a defect of detrimental condition found in a pressure vessel, the Inspector may require a pressure test. A pressure test normally need not be made as part of a periodic inspection. However, a test shall be made when unusual, hard to evaluate forms of deterioration possibly affecting the safety of a vessel are disclosed by inspection and also after certain repairs.

(b) To determine tightness, the test pressure need be no greater than the set pressure of the safety valve having the lowest setting.

(c) The pressure test shall not exceed 1 1/2 times the maximum allowable working pressure.

(d) During a pressure test, where the test pressure will exceed the set pressure of the safety valve having the lowest setting, the safety relief valve or valves shall be removed or each valve disk be held down by means of a test clamp and not by applying additional load to the valve spring by turning the compression screw.

(e) The minimum temperature of the water used to apply a hydrostatic test shall not be less than 70° F unless the owner provides information on the brittle characteristics of the vessel material to indicate the acceptability of a lower test temperature. The maximum temperature is not to be more than 120° F unless the owner specifies a temperature higher than 120° F, the pressure shall be reduced to the MAWP and the temperature to 120° F for close inspection.

(f) When the contents of the vessel prohibit contamination by any other medium or when a hydrostatic test is not possible, other testing media may be used providing the precautionary requirements are adhered to. In such cases, there shall be agreement as to the testing procedure between the owner and the Inspector.

CHAPTER 5.00: HEATING BOILERS

5.01: Scope and Application

(1) Requirements. 522 CMR 5.00 shall apply to **boilers** used for steam generation, hot water heating **boilers**, hot water supply **boilers**, or for heating liquids used as a heat storage source which exceed three horsepower, as follows:

(a) Steam Heating **Boilers**. Having a capacity of more than 207 pounds of steam per hour output and not in excess of 15 p.s.i.

(b) Hot Water heating **Boilers**:

1. Not exceeding 30 psig operating pressure; or 250° F operating temperature.

2. Having a capacity of more than 200,000 BTU output of the **boiler** nozzle.

(c) Hot Water Supply **Boilers** and Other Liquid Heat Storage Sources Not Exceeding:

1. 160 psig operating pressure;

2. 250° F operating temperature, except that 522 CMR 5.00 shall not apply to units in this category when none of the following limitations are exceeded:

Heat input of 200,000 BTU per hour;

A water temperature of 200° F;

A nominal water containing capacity of 120 gallons.

(d) Scope. 1998 Section IV of the A.S.M.E. Code, with 1999 addenda, together with the rules contained herein shall be the Rules for Construction and Installation of Low Pressure Heating **Boilers**, and the construction and installation of low pressure heating **boilers** shall conform thereto. (Said 1998 Section IV of the Code is filed with the Secretary of the Commonwealth herewith).

(e) Stamping. All Low Pressure Heating **Boilers** shall have the A.S.M.E. (H) stamp, stamped or cast into the metal of the **boiler**. All Low Pressure Heating **Boilers**, except cast iron and "Mass. Heat" **boilers** shall also be stamped National Board and data reports shall be registered with the National Board.

(f) Exceptions. **Boilers** operated at pressures not exceeding the above units which were in the Commonwealth prior to filing of 522 CMR 5.00 with the State Secretary and which conform to the Existing Installation Rules hereafter established may be continued in such service. The rule for installation and appurtenances shall apply to a relocated **boiler** to the extent permitted by the design and construction of the **boiler**. All rules and parts of rules inconsistent herewith are hereby repealed.

5.02: Definitions

(1) Authorized Manufacturer. A **boiler** manufacturer who has registered with the Board of **Boiler** Rules and has been authorized by the Board to build low pressure steel plate **boilers** for use in Massachusetts, or a **boiler** manufacturer who has a certificate of authorization to use the ASME Code "H" stamps.

(2) National Board. The National Board of **Boiler** and Pressure Vessel Inspectors with headquarters in Columbus, Ohio.

(3) Commissioned Pressure Vessel Inspector.

(a) A district engineering inspector employed by the Division of Inspection, Department of Public Safety, Commonwealth of Massachusetts, or

(b) A pressure vessel inspector holding a certificate of competency as a pressure vessel inspector issued him by the Division of Inspection to field inspect pressure vessel within the Commonwealth or make shop inspections in the shop of an authorized manufacturer while employed by the authorized insurance company named in the certificate, or

(c) A pressure vessel inspector employed by an authorized insurance company who holds a current commission issued him by the National Board, or such other inspectors holding National Board Commission as are approved by the Chief of Inspections.

NOTE: Field inspections of **boilers** in Massachusetts may be made only by district engineering inspectors in the employ of, or holders of certificates of competency issued by the Department of Public Safety of the Commonwealth of Massachusetts.

(4) Massachusetts Heat **Boiler**. A steel plate **boiler** built by an authorized manufacturer in

accordance with the requirements of Section IV of the A.S.M.E. Code but not stamped with the Code symbol.

5.03: General Requirements

(1) Massachusetts Heat **Boilers**, Inspection and Stamping. Mass. Heat **Boilers** shall be inspected during construction by an authorized pressure vessel inspector holding a current Massachusetts certificate of competency as a pressure vessel inspector or a district Engineering Inspector employed by the Department of Public Safety, Division of inspection.

Each **boiler** shall be stamped MASS. HEAT together with the Mass. Heat number and year built, and with the following data:

(a) Manufacturer's name

(b) Maximum allowable working pressure

(c) Safety valve relieving capacity (minimum) in pounds per hour

A manufacturer's data report shall be filed with the Chief of Inspections, Department of Public Safety, on forms approved by the Chief of Inspections (M.G.L. c. 146, § 18).

(2) Frequency of Inspection. Low Pressure Heating **Boilers** shall be inspected as follows:

(a) Steam **Boilers**. Annual external which shall include an internal inspection when construction permits.

(b) Hot Water **Boilers** (Heating, Supply and Heat Storage Source). Annual external with an internal once each three years where construction permits. The year the internal inspection is made the external inspection may be made at the same time.

(3) Inspection Reports. Inspection reports shall be submitted on forms approved by the Division of Inspection of the Department of Public Safety.

(4) Preparation of Inspection. the owner or user of a **boiler** which requires internal inspection by the Division of inspection of the Department of Public Safety, or by an insurance company, as provided by M.G.L. c. 146, shall prepare the **boiler** for inspection by cooling (blanking off connections to adjacent **boilers**, if necessary), removing all soot and ashes from tubes, heads, shell, furnace and combustion chamber; drawing off the water; removing the handhole and manhole plates; removing grate bars from internally fired **boilers**; and removing the steam gage for testing.

If a **boiler** has not been properly cooled, or otherwise prepared for inspection, the **boiler** inspector shall decline to inspect it, and he shall not issue a certificate of inspection until a satisfactory inspection has been made.

(5) Certificate of Inspection. The certificate of inspection, as required by M.G.L. c. 146, § 2, shall be that authorized by the Board.

The certificate of inspection shall be posted in a conspicuous place in the engine or boiler room in which the boiler specified is located; and it shall not be removed therefrom unless the boiler or its appendages become defective, or a new certificate is issued. If in the judgment of the inspector the boiler or its appendages are found to be in a defective or dangerous condition the certificate shall be removed by a district engineering inspector or the Division of Inspection of the Department of Public Safety, or an inspector holding a certificate of competency as an inspector of pressure vessels, as provided by M.G.L. c. 146.

(6) **Boilers Removed from the Commonwealth.** A boiler which has been used in this Commonwealth and removed therefrom, which does not conform in every detail with the rules of construction formulated by this Board, and has been previously inspected by a district engineering inspector of the Division of Inspection of the Department of Public Safety, or by and inspector of an insurance company authorized to insure steam boilers in this Commonwealth, and has been stamped with a Mass. Serial Number, may be inspected and a certificate of inspection issued if relocated in this Commonwealth.

(7) **Installation of Used Boilers in the Commonwealth.** whoever owns and operates a boiler not in the Commonwealth of Massachusetts which was not shop inspected and stamped in accordance with the Code, but bears the stamping of another state or political subdivision which has adopted a standard of construction equivalent to that of Massachusetts, and wishes to operate said steam boiler within the Commonwealth of Massachusetts, may petition the Chief of Inspections of the Department of Public Safety for permission to do so. Such petition shall be accompanied by a copy of the original data report of the manufacturer of the boiler, signed by the inspector who made the original shop inspection, together with the field inspection data sheet and report covering the inspection of the boiler, made by a commissioned boiler inspector. Upon receiving this information and if the boiler is found to comply with the Massachusetts rules with regard to material, construction and workmanship, and found to be in safe working condition and equipped with all necessary appendages, the Chief of Inspections shall cause to be issued a certificate of inspection establishing the safe working pressure.

5.04: Steel Plate Boilers

(1) **Maximum Allowable Pressure.** Whenever the term "maximum allowable pressure" is used, it refers to gauge pressure or the pressure above the atmospheric pressure in pounds per square inch.

(2) **Authorization to Manufacturer.** Unless a boiler manufacturer holds the appropriate ASME Code stamp, any manufacturer who desires to construct low pressure steel plate boilers, for use in Massachusetts, shall make written application to the Board of Boiler Rules for permission to construct such boilers and receive written authority from said board before taking any steps toward furnishing them for use in Massachusetts.

The manufacturer shall furnish the Board such information as may be required to determine that he has the equipment and is otherwise application and has made arrangements for shop

inspections when required by 522 CMR 5.00.

5.05: Fusion Welded Boilers

(1) Fusion Welding. The fusion welding process consists of manual or of machine welding using either the arc or gas welding process.

(2) Steel Plate Boilers. Steel plate boilers, constructed by fusion welding under the rules prescribed for steel plate heating boilers may be used for steam heating at pressures not exceeding 15 p.s.i. assuming the strength of the welded joint at 28,000 p.s.i. of net section of plate. In determining the pitch of staybolts, fusion welded joints may be considered as fully supported except where the joint occurs in a flat surface.

(3) Design and Construction. The design, construction, and stamping fusion welded boilers shall in all cases conform to the formulas, specifications, and data which are given in the rules prescribed for steel plate heating boilers, unless some special requirement is necessary because of welding, in which case the requirement will be hereinafter detailed.

(4) Inspection of Boilers:

(a) A boiler constructed in accordance with 522 CMR 5.00 and shop inspected by an authorized inspector who is not commissioned in accordance with the National Board by laws, shall be stamped MASS. HEAT together with the Mass. Heat number, and data shall be filed with the Chief of Inspections, Division of Inspection, Department of Public Safety.

Data reports for other riveted or welded boilers shall be furnished the Chief of Inspections by the boiler manufacturer upon request.

All data reports to be signed by the manufacturer's representative.

All data reports for shop inspected boilers to be signed by the shop inspector.

(b) All boilers to which the code symbol is to be applied shall be built according to 522 CMR 5.00 by a manufacturer who is in possession of a code symbol stamp and a valid certificate of authorization. Each boiler shall be stamped with the Code symbol Shown in 522 CMR 5.05(4)(b): *Figures 1 and 2* with the following data:

FIGURE 1

FORM OF STAMPING ON COMPLETED CAST IRON BOILERS

OR THEIR NAMEPLATES


	<hr/> (Name of Shop Assembler)	
	Maximum W.P.	Steam 15 psi Water ____ psi
Minimum relief capacity lb/hr or MBH		

Image 1 (3" X 5.25") Available for Offline Print

FIGURE 2

BOILERS SUITABLE FOR WATER ONLY


	<hr/> (Name of Shop Assembler)	
	Maximum W.P.	Water ____ psi
Minimum relief capacity lb/hr or MBH		

Image 2 (3" X 5.25") Available for Offline Print

(5) Stamping requirements for **Boilers** Other than those Constructed Primarily of Cast Iron (See 522 CMR 5.05(4)(b): *Figure 1*)

(a) All **boilers** to which the Code Symbol is to be applied shall be built according to valid Certificate of Authorization. Each **boiler** shall be marked, stamped, or cast with the Code symbol used for heating **boilers**, and with the following data:

1. manufacturer's name;
2. maximum allowable working pressure;

3. safety or safety relief valve capacity (minimum), lb/hr or MBH;

4. manufacturer's serial number;

5. year built

NOTE: the year built may be incorporated into the serial number as a prefix consisting of the last two digits of the year.

(b) ~~522 CMR 5.05(5)(a)1. through 5.~~ with the markings arranged substantially as shown in figure 1 shall be stamped with letters at least 5/16" high and in some conspicuous place on the boiler proper or on a stamping plate at least 3/64" thick permanently fastened to the boiler proper. The location of the stamping shall be as follows:

1. Horizontal Tubular Flue Type Boilers: on the front heat above the central rows of tubes or flues.

2. Locomotive Firebox, Compact, or Vertical Firetube Type Boilers: over or near the fire door or handhole or washout plug opening on the front end or side.

3. Watertube Type Boilers: on a head of the top outlet drum. Waterwalls and headers shall carry identifying markings.

4. Split Section and Section Firebox Type Wrought Boilers: over or near the fire door or handhole or washout plug opening on the front end or side. Each section shall carry identifying markings.

5. Scotch Type Boilers: on either side of the shell near the normal water level line adjacent to the front tubesheet.

(c) on any of the above type boilers where there is not sufficient space in the places designated and on other types and new designs of boilers, the stamping plates shall be located in a conspicuous place.

(d) The stamping or stamping plate on the boiler proper shall not be covered with insulating or other material unless:

1. the required stamping and arrangement thereof is duplicated and located in a conspicuous place on the jacket or other form of casing either on metallic plate, not less than 3" x 4" in size and permanently attached to the casing or stamped directly thereon;

2. If a nameplate is also used, it shall be of nonferrous material, shall be permanently fastened to the boiler casing, and shall be marked with letters and numerals at least 1/8" high.

(6) Marking Requirements for Cast Iron Boilers.

(a) All ~~boiler~~ parts or sections to which the Code Symbol is to be applied shall be built according to 522 CMR 5.05 by a manufacturer who is in possession of a Code Symbol Stamp and a valid Certificate of Authorization. Each ~~boiler~~ section, including end and intermediate cored sections, shall be cast with the Code Symbol for Heating ~~Boilers~~, and with the following data cast in letters or numerals at least 5/16" high:

1. manufacturer's name or acceptable appreciation;
2. maximum allowable working pressure;
3. pattern number;
4. casting date;
5. shop assemblers name or acceptable abbreviation (if different from manufacturer).

Other data may be cast on the sections. The marking "ASME" or "ASME Standard" shall not be used.

(b) When the ~~boiler~~ size and number of sections have been decided, the completed ~~boiler~~ shall be marked with the Code Symbol for Heating ~~Boilers~~ and with the following data:

1. Shop assembler's name
2. maximum allowable working pressure
3. safety or safety relief valve capacity (minimum) lb/hr or MBH

(c) ~~Permission to use the A.S.M.E. Symbol will be granted by the Society pursuant to 522 CMR 5.05(6)(c). Any manufacturer or assembler may apply to the Boiler Code Committee of the Society upon form issued by the Society, for the permission to use the appropriate stamp or stamps. Each applicant must agree that if permission to use any such stamp is granted, it will be used according to the rules and regulations of this code and that any such stamps will be promptly returned to the Society upon demand, or in case the applicant discontinues the manufacture or assembly of the above, or in the case the certificate of authorization issued to such applicant has expired and no new certificate has been issued. The holder of any such stamps shall not permit any other manufacturer or assembler to use his stamps.~~

~~Permission to use such stamps may be granted or withheld by the Society in its absolute discretion. If permission is given, and the proper administrative fee paid, a certificate of authorization evidencing permission to use any such symbol, will be forwarded to the applicant. Each such certificate will be signed by the Chairman and Secretary, or other authorized officer or officers, of the Boiler Code Committee. Six months prior to the date of expiration of any such certificate, the applicant must apply for a renewal or such permission and the issuance of a new certificate.~~

The Society reserves the absolute right to cancel or refuse to renew such permission returning fees paid for pro-rated unexpired term.

The ~~Boiler~~ Code Committee may at any time and from time to time make such regulations concerning the issuance and use of such stamps as it deems appropriate, and all such regulations shall become binding upon the holders of any valid certificates of authorization.

All steel stamps used for applying the symbol shall be purchased from the Society.

(d) No accessory or part of a ~~boiler~~ must be marked "ASME" or "ASME STANDARD" unless so specified in the Code.

(7) Welded H Symbol. The manufacturer of welded H Symbol shall construct the ~~boilers~~ to be marked with the Code according to the requirements of the Code. Inspection shall be made by an authorized inspector. The inspector procedure by which the inspector assures himself that the manufacturer is complying with all the requirements of the Code is the responsibility of the authorized inspector.

The inspector shall make such inspections as he believes are needed to enable him to certify that the ~~boilers~~ have been constructed in accordance with the A.S.M.E. Code. The authorized inspector shall be a state inspector, a municipal inspector or an inspector employed regularly by an insurance company. This inspector shall have been qualified by written examination under the rules of any state which has adopted the Code.

(8) Identification Plate. Each plate of a completed ~~boiler~~ shall bear the plate maker's name with the brand and tensile strength. If the ~~boiler~~ is inspected during construction by an authorized inspector and the inspector assures himself that the plate material conforms to the A.S.M.E. Code requirements, the plate maker's marks need not appear after completion of the ~~boiler~~.

5.06: Cast Iron Boilers

522 CMR 5.06 shall apply to the construction of cast iron ~~boilers~~.

(1) Maximum Allowable Working Pressure. Wherever the term "maximum allowable working pressure" is used herein, it refers to gage pressure or the pressure above the atmosphere in pounds per square inch.

(2) Marking of ~~Boilers~~.

(a) All ~~boilers~~ built according to 522 CMR 5.00, and no other ~~boilers~~, shall be plainly and permanently either marked, stamped, or cast with the symbol for heating ~~boilers~~, and the minimum safety valve capacity required when the size and number of sections has been decided. The markings shall consist of:

1. Manufacturer's name, or manufacturer's and distributor's name.

2. The maximum allowable working pressure.

3. Capacity (for determining safety valve capacity) showing the greatest maximum output in BTU's per hour (1,000 BTU's = 1 pound of steam). 522 CMR 5.06(2)(a)1. and 2. in letters and figures at least 5/16" high shall be stamped or cast on all of the cored sections. 522 CMR 5.06(2)(a)1., 2., and 3. shall be marked on the completed boiler or casing in some conspicuous place with letters and figures at least 5/16" high. If a name plate is used, it is to be of nonferrous material permanently attached to the boiler casing, the letters and figures to be not less than 1/8 inch high.

(b) Boilers suitable for use for both steam and water shall have marking arranged substantially as shown in figure 1. Stamping shall not be covered with insulating or other material except when a casing or other form of cover applied to the boiler is so arranged that it is not desirable to provide an opening through which the required stamping shall also be placed on a metallic plate not less than three by four inches in size irremovably attached to the front portion of the casing, or stamped directly thereon.

Permission to use the symbol referred to in 522 CMR 5.06 will be granted by the Boiler Code Committee of the Society pursuant to the provisions set forth by the A.S.M.E.

5.07: Installation, Fittings and Appliances

522 CMR 5.07 shall apply to the installation, fittings and appliances of steel plate and cast iron steam boilers.

NOTE: If a rule is applicable only to steel plate or cast iron boilers it will be so stated in the rule.

(1) Heating Surface. The heating surface shall be computed as follows:

(a) Heating surface, as part of a circulating system in contact on one side with water or wet steam being heated and on the other side with gas or refractory being cooled, shall be measured on the side receiving heat.

(b) Boiler heating surface and other equivalent surface outside the furnace shall be measured circumferentially plus any extended surface.

(c) Waterwall heating surface and other equivalent surface within the furnace shall be measured as the projected tube area (diameter x length) plus any extended surface on the furnace side. In computing the heating surface for this purpose, only the tubes, fireboxes, shells, tubesheets, and the projected area of headers need be considered, except that for vertical firetube steam boilers, only that portion of the tube surface up to the middle of the gage glass is to be computed.

(2) Valve Capacity. The minimum valve capacity in pounds per hour shall be greater of that determined on the basis of pounds of steam generated per hour per square foot of boiler heating surface as given in 522 CMR 5.07: Table 2. In many cases a greater relieving capacity of valves will have to be provided than the minimum specified by 522 CMR 5.00. In every case, the requirement of 522 CMR 5.07(4)(a) shall be met.

(3) Safety Relief Valve Requirements for Hot Water Boilers. Each hot water heating boiler shall have at least one officially rated pressure relief valve set to relieve at or below the maximum allowable working pressure of the boiler. Each hot water supply boiler shall have at least one officially rated safety relief valve or at least one officially rated pressure-temperature relief valve of the automatic re-seating type set to relieve at or below the maximum allowable working pressure of the boiler. Safety relief valves officially rated as to capacity shall have pop action when tested by steam. When more than one safety relief valve is used on either hot water heating or hot water supply boilers, the additional valve or valves shall be officially rated and may be set within a range not to exceed 6 p.s.i. above the maximum allowable working pressure of the boiler up to and including 60 p.s.i. and 5% for those having a maximum allowable working pressure exceeding 60 p.s.i. Safety relief valves shall be spring loaded. Safety relief valves shall be so arranged that they can not be reset at a higher pressure than the maximum permitted by 522 CMR 5.07.

(4) Thermal Elements for Pressure-Temperature Relief Valves. The thermal elements for pressure-temperature relief valves shall be so designed and constructed that they will not fail in any manner which could obstruct flow passages or reduce capacities of the valves when the elements are subjected to steam temperatures.

NOTE: Since the temperature elements are designed for temperatures up to only 250° F, they will fail when subjected to steam pressures with corresponding saturation temperatures in excess of 250° F.

(a) The valve capacity for each boiler shall be such that with the fuel burning equipment installed, the pressure cannot rise more than five pounds above the maximum allowable working pressure.

(b) When operating conditions are changed, or additional boiler heating surface is installed, the valve capacity shall be increased, if necessary, to meet the new conditions and be in accordance with the A.S.M.E. Code. The additional valves required, on account of changed conditions, may be installed on the outlet piping provided there is not intervening valve.

(5) Size Required. When solid fuel is used, the minimum size of the safety valve or valves for each boiler shall be determined by the amount of grate area as given in 522 CMR 5.07: Table 2.

TABLE 2
MINIMUM POUNDS OF STEAM PER HOUR
PER SQUARE FOOT OF HEATING SURFACE

	Firetube	Watertube
Boiler Heating Surface	Boilers	Boilers
Hand fired	5	6
Stoker fired	7	8

-		
-	Oil, gas, or pulverized	
-	fuel fired	8 — 10
-		
-	Single pass fire tube	12
-		
-	Waterwall Heating Surface	
-		
-	Hand fired	8 — 8
-		
-	Stoker fired	10 — 12
-		
-	Oil, gas or pulverized	
-	fuel fired	14 — 16
-		

NOTES:

(1) When a boiler is fired only by a gas having a heat value not in excess of 200 BTU's/cubic foot, the minimum safety valves or safety relief valve capacity may be based on the values given for hand fired boilers above.

(2) The minimum safety valve or safety relieving capacity for electric boilers shall be 3 1/2 pounds per hour per kW input.

(3) For heating surface determination, see HG-403 of Section IV of the A.S.M.E. Code.

(6) **Boiler Horsepower.** As determined by the manufacturer.

(a) Equivalent **Boiler Horsepower.** When liquid or gaseous fuel, electric or atomic energy or any other source of heat is use the horsepower of a boiler shall be based on the relieving capacity or aggregate relieving capacity of the safety valve or valves, divided by 34.5, when the safety valve or valves are set to blow at a pressure exceeding 25 pounds per square inch.

(b) When liquid or gaseous fuel, electric or atomic energy or any other source of heat is used the horsepower of a boiler shall be based on the relieving capacity or aggregate relieving capacity of the safety valve or valves, divided by 34.5 divided by two, when the safety valve or valves are set to blow at 25 pounds per square inch or less.

(7) **Steam Gages.** Each steam boiler shall have a steam gage connected to its steam space, or to its water column, or to its steam connection by means of a siphon or equivalent device exterior to the boiler and of sufficient capacity to keep the gage tube filled with water and so arranged that the gage cannot be shut off from the boiler except by a cock with tee or lever handle, placed in the pipe near the gage. The handle of the cock shall be parallel to the pipe in which it is located when the cock is open. The scale on the dial of a steam boiler gage shall be evenly graduated to not less than 30 pounds. The gage shall be provided with effective stops for the indicating pointer at the zero point and at the maximum pressure point. The travel at the pointer from zero to thirty pounds pressure shall be at least three inches. Connection to steam gage siphons shall be

of nonferrous metal when smaller than one inch pipe size and longer than five feet between the siphon and point of connection of pipe to the boiler, and also when smaller than 1/2 " pipe size and shorter than five feet between the siphon and the point of connection of pipe to boiler. On compound gage, effective stops shall be set at the limits of the gage readings on both the pressure and vacuum sides.

(8) Test Connection. Each boiler shall be provided with a 1/4 " connection between the siphon and the gage or attaching inspector's test gage when boiler is in service, so that accuracy of the boiler steam gage can be ascertained.

(9) Water Gage Glasses:

(a) Each steam boiler shall have one or more water gage glasses attached to the water column or boiler by means of valves fittings not less than 1/2 " pipe size, with the lower fitting provided with a drain valve of a type having an unrestricted drain opening not less than 1/4 " in diameter to facilitate cleaning. Gage glass replacement shall be possible under pressure. Water glass fittings may be attached directly to a boiler.

(b) The lowest visible part of the water gage glass shall be at least one inch above the lowest permissible water level recommended by the boiler manufacturer. With the boiler operating at this lowest permissible water level, there shall be not danger of overheating any part of the boiler.

Each boiler shall be provided at the time of the manufacture with a permanent marker indicating the lowest permissible water level. The marker shall be stamped, etched, or cast in metal, or it shall be a metallic plate attached by rivets, screws, or welding, or it shall consist of material with documented tests showing its suitability as a permanent marking for the application. This marker shall be visible at all times. Where the boiler is shipped with a jacket, this marker may be located on the jacket.

NOTE: Transparent material other than glass may be used for the water gage provided that the material will remain transparent and has proved suitable for the pressure, temperature, and corrosive conditions expected in service.

(c) In electric boiler of the submerged electrode type, the water gage glass shall be so located to indicate the water levels both at startup and under the maximum steam load conditions as established by the manufacturer.

(d) In electric boilers of the resistance heating element type the lowest visible part of the water gage glass shall also be equipped with an automatic low water electrical power cutoff so located as to automatically cut off the power supply before the surface of the water falls below the top of the electrical resistance heating elements.

(e) Tubular water glasses on electric boilers having a normal water content not exceeding 100 gallons shall be equipped with a protective shield.

(10) Pressure Control. Each automatically fired steam boiler shall be protected from over pressure by two pressure operated controls.

(a) Each individual automatically fired steam boiler shall have a safety limit control that will cut off the fuel supply to prevent steam pressure from exceeding the 15 p.s.i. maximum allowable working pressure of the boiler. Each control shall be constructed to prevent a pressure setting above 15 p.s.i.

(b) Each individual steam boiler or each system of commonly connected steam boilers shall have a control that will cut off the fuel supply when the pressure reaches an operating limit, which shall be less than the maximum allowable pressure.

(c) Shutoff valves of any type shall not be placed in the steam pressure connection between the boiler and the controls described in 522 CMR 5.07(10)(a) and (b). These controls shall be protected with a siphon or equivalent means of maintaining a water seal that will prevent steam from entering the control. The connections to the boiler shall not be less than 1/4 standard pipe size, but where steel or wrought iron pipe or tubing is used, they shall not be less than 1/2 inch standard pipe size. The minimum size of a siphon shall be 1/4 inch standard pipe size or 3/8" O.D. nonferrous tubing.

(11) Automatic Low Water Fuel Cutoff and/or Water Feeding Device.

(a) Each automatically fired steam or vapor system boiler shall have an automatic low water fuel cutoff so located as to automatically cut off the fuel supply when the surface of the water falls to the lowest visible part of the water gage glass. If a water feeding device is installed, it shall be so constructed that the water inlet valve cannot feed water into the boiler through the float chamber and so located as to supply requisite feedwater.

(b) Such a fuel cutoff or water feeding device may be attached directly to a boiler. A fuel cutoff or water feeding device may also be installed to the tapped openings available for attaching a water glass direct to a boiler, provided the connections are made to the boiler with nonferrous tees or Y's not less than 1/2 inch pipe size between the boiler and the water glass so that the water glass is attached directly and as close as possible to the boiler; the run on the tee or Y shall take the fuel cutoff or water feeding device. The ends of all nipples shall be reamed to full size diameter.

(c) Fuel cutoffs and water feeding devices embodying a separate chamber shall have a vertical drain pipe and blowoff valve not less than 3/4 inch pipe size, located at the lowest point in the water equalizing pipe connections so that the chamber and the equalizing pipe can be flushed and the device tested.

(d) Hot water boilers having a submerged automatic low water cut out chamber device must be installed so that the low water cut out can cause the boiler to shut off on manual test.

(12) Pressure or Altitude Gage.

(a) Each hot water heating boiler shall have a pressure or altitude gage connected to its flow connection in such a manner that it cannot be shut off from the boiler except by a cock with tee

or lever handle, placed on the pipe near the gage. The handle of the cock shall be parallel to the pipe in which it is located when the cock is open.

(b) The scale on the dial of the pressure or altitude gage shall be graduated approximately to not less than 1 1/2 nor more than three times the pressure at which the safety relief valve is set.

(c) Piping or tubing for pressure or altitude gage connections shall be nonferrous metal when smaller than one inch pipe size.

(13) Thermometers. Each hot water boiler shall have a thermometer so located and connected that it shall be easily readable when observing the water pressure or altitude. The thermometer shall be so located that it shall at all times indicate the temperature in degrees Fahrenheit of the water in the boiler at or near the outlet. The thermometer may be combined with the pressure gage within a single instrument case if a standard instrument is used.

(14) Temperature Control. Each automatically fired hot water heating boiler shall be protected from over temperature by two temperature operated controls.

(a) Each individual automatically fired hot water heating boiler shall have a safety limit control that will cut off the fuel supply to prevent water temperature from exceeding the maximum allowable temperature of 250° F at the boiler outlet. This water temperature safety control shall be constructed to prevent a temperature setting above 250° F.

(b) Each individual hot water boiler or each system of commonly connected boilers without intervening valves shall have a control that will cut off the fuel supply when the water temperature reaches an operating limit, which shall be less than the maximum allowable temperature.

(15) Low Water Fuel Cutoff.

(a) Each automatically fired hot water heating boiler with heat output greater than 200,000 BTU's/hr shall have an automatic low water fuel cutoff which has been designed for hot water service and it shall be so located as to automatically cut off the fuel supply when the surface of the water falls to the level established in 522 CMR 5.07(15)(b).

(b) As there is no normal waterline to be maintained in a hot water heating boiler, any location of the low water fuel cut off above the lowest safe permissible water level established by the boiler manufacturer is satisfactory.

(c) A coil type boiler or a watertube boiler with heat input greater than 200,000 BTU's/hr requiring forced circulation to prevent overheating of the coils or tubes shall have a flow sensing device installed in the outlet piping in lieu of the low water fuel cutoff required in 522 CMR 5.07(15)(a) to automatically cut off the fuel supply when the circulating flow is interrupted.

(d) Low water cutoffs for heating boiler shall have a means for testing the operation of the device without resorting to draining the entire system. Such means shall not render the device unsafe or inoperable.

~~(16) Electrical Code Compliance. All field wiring for controls, heat generating apparatus, and other appurtenances necessary for the operation of the boiler or boilers shall be installed in accordance with the provisions of the national Electric Code and must comply with the applicable local electrical codes. All boilers supplied with factory mounted and wired controls, heat generating apparatus, and other appurtenances necessary for the operation of the boilers shall be installed in accordance with the provisions of the nationally recognized standards.~~

~~(17) Type Circuitry to be Used. Whether field or factory wired, the control circuitry shall be positively grounded and shall operate at 150 V or less. One of the two following systems may be employed to provide the control circuit:~~

~~(a) Two wire Nominal 120 V System with Separate Equipment Ground Conductor~~

~~1. This system shall consist of the line, neutral, and equipment ground conductors. The control panel frame and associated control circuitry metallic enclosures shall be electrically continuous and be bonded to the equipment ground conductor.~~

~~2. The equipment ground conductor and the neutral conductor shall be bonded together at their origin in the electrical system as required by Appendix H of Section IV of the A.S.M.E. Code.~~

~~3. The line side of the control circuit shall be provided with a time delay fuse sized as small as practicable.~~

~~(b) Two wire Nominal 120 V System Obtained by Using an Isolation Transformer~~

~~1. The two wire control circuit shall be obtained from the secondary side of an isolation transformer. One wire from the secondary of this transformer shall be electrically continuous and shall be bonded to a convenient cold water pipe. All metallic enclosures of control components shall be securely bonded to this ground control circuit wire. The primary side of the isolation transformer will normally be a two wire source with a potential 230 or 208 V or 440 V.~~

~~2. Both sides of the two wire primary circuit shall be fused. The hot leg on the load side of the isolation transformer shall be fused as small as practicable and in no case fused above the rating of the isolation transformer.~~

~~(18) Limit Controls. Limit controls shall be wired on the hot or line side of the control circuit.~~

~~(19) Shutdown Switches and Circuit Breakers. A manually operated remote heating plant shutdown switch or circuit breaker should be located just outside the boiler room door and marked for easy identification. Consideration should also be given to the type and location of the switch to safeguard against tampering. If the boiler room door is on the building exterior the switch should be located just inside the door. If there is more than one door to the boiler room, there should be a switch located at each door. In any case, the requirements of the State Fire Marshall relating to oil burner controls must be complied with.~~

~~(20) Controls and Heat Generating Apparatus:~~

(a) Oil and gas fired and electrically heated ~~boilers~~ shall be equipped with suitable primary (flame safeguard) safety controls, safety limit switches, and burners or electric elements as required by a nationally recognized standard.

(b) The symbol of the certifying organization which has investigated such equipment as having complied with a nationally recognized standard shall be affixed to the equipment and shall be considered as evidence that the unit was manufactured in accordance with that standard.

CHAPTER 6.00: LOW PRESSURE HEATING ~~BOILERS~~

6.01: Scope and Application

(1) In accordance with the provisions of M.G.L. c. 146, § 2, the Board of ~~Boiler~~ Rules herewith adopts by reference the provisions of RULES FOR CONSTRUCTION OF LOW PRESSURE HEATING ~~BOILERS~~, 1998 Edition, with 1999 addenda, formulated and published by the American Society of Mechanical Engineers, as ASME ~~BOILER AND PRESSURE VESSEL CODE SECTION IV~~.

(2) The amendments herein, including deletions and/or additional requirements, shall take effect six months after publication by the Secretary of the Commonwealth, provided the Board may upon request, permit application of the amended rules to installations made during said six months.

(3) ~~522 CMR 6.00 shall be applicable insofar as it pertains to construction and appurtenances of low pressure heating boilers which come within the scope of M.G.L. c. 146.~~

CHAPTER ~~522 CMR~~ 7.00: AIR TANKS

7.01: Scope

In accordance with the provisions of M.G.L. c. 146, § 2, the Board herewith adopts by reference the ASME ~~Boiler~~ and Pressure Vessel Code Section VIII, Rules for Construction of Pressure Vessels.

(1) 522 CMR 7.00 shall apply to all air tanks enumerated in M.G.L. c. 146, § 34 including
~~applies to~~ the following:

(a) Tanks hereafter constructed.

(b) Tanks that meet any of the following criteria:

~~(a)~~ 1. design MAWP greater than 50 PSI;

~~(b)~~ 2. greater than six inches internal diameter; or

~~(c)~~ 3. internal volume greater than one cubic foot.

~~used for the storage of one cubic foot capacity or more of compressed air and at a pressure exceeding 50 p.s.i. and having an inside diameter of greater than six inches.~~

The exemption of tanks containing less than one cubic foot of air applies to each single vessel and not to an assembly of vessels.

~~(e) Tanks in which compressed air is used to discharge the contents of the tank, for example, air and oil tanks used with automobile lifts, paint spraying tanks, and abrasive blast tanks.~~

~~(d) Tanks in which air is used in the process of impregnating materials.~~

~~(e) Intercoolers and aftercoolers which are not integral parts of compressors, air purifiers, reheaters and similar vessels used in a compressed air system.~~

(2) 522 CMR 7.00 ~~does shall~~ not apply to the exceptions enumerated in M.G.L. c. 146, § 34 including the following:

(a) Tanks subject to Federal control.

(b) Tanks attached to locomotives, street cars, railway cars, trackless trolley vehicles, or to motor vehicles for use in operating such vehicles or their brakes or body lifting apparatus.

(c) Tanks in which air is used solely for cushioning systems containing water or other liquids.

~~(d) Tanks having an inside diameter of six inches or less.~~

~~(e)~~ Tanks containing air and liquids in which the pressure is maintained by pumps; for example, hydraulic elevator tanks.

~~(e)~~ A tank or other receptacle used by divers if such tank or other receptacle is inspected by the refilling agency.

(f) Portable tanks and bottles containing compressed air as used for breathing purposes while combating fires or used in rescue operations in contaminated areas; and storage tanks and mechanical filling systems used to fill such portable tanks and bottles.

(g) Tanks used in and as part of electrical substations owned and operated by electric company, as defined M.G.L. c. 164, § 1.

7.02: Construction

All air tanks under the scope of this section shall be initially constructed in accordance with the Section VIII of the ASME ~~Boiler~~Boiler and Pressure Vessel Code.

7.03: Installation

(1) All tanks shall be available for complete External Inspection and shall be so installed that there will be not less than 12 inches between the tank and any floor, wall, ceiling or other obstruction, except where a tank is attached to a portable compressor by means of straps and is removable for complete inspection. -The 12-inch clearance may be waived by the District Engineering Inspector. Tanks installed prior to October 1977 may have the 12-inch clearance waived by an Authorized Inspector or the District Engineering Inspector. The District Engineering Inspector shall document in their report that there was not a clearance of 12 inches but a complete External and Internal Inspection could be made. -The name plate, safety valve, drain, pressure gauge, tank bottom, and inspection openings must be readily visible and accessible if the clearance requirement is to be waived.

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(2) In case of vertical tanks the bottom head if dished must have the pressure on the concave side to ensure complete drainage.

- (3) Vertical tanks with a base ring must have unobstructed access to the tank bottom for inspection.
- (4) Air tanks in a fixed installation shall be secured to prevent movement.
- (5) Steel piping shall be used from the air tank outlet to the first block valve of the air distribution system.
- (6) Air tanks that can be isolated with block valves shall have a pressure relief valve attached to the pressure vessel.
- (7) Air tanks that can be isolated with block valves shall have a pressure gage attached to the pressure vessel per this code.
- (8) The connection to the pressure relief valve shall be as short as possible and not reduced.
- (9) The pressure relief valve shall discharge to a safe location.
- (10) The pressure relief valve shall be sized to relief the capacity of all compressors which may operate at one time.
- (11) In systems with multiple tanks all tanks must have a safety relief valve which lifts at the pressure of that tank with the lowest MAWP of other means must be provided to prevent pressurizing any tank to a pressure greater than that tanks MAWP.
- (12) Tanks shall be protected from external corrosion.
- (13) Automatic drains may be used in addition to the drain required by this code.
- (14) All tanks shall be protected by such safety valves and indicating and controlling devices as will ensure their safety operation. These devices shall be so constructed, located, and installed that they cannot readily be rendered inoperative.

7.04: Inspections and Certificates

(1) Field Inspection.

(a) All first ~~Certificate~~ inspections must be performed by a District Engineering Inspector before the tank is put into service. All tanks except those listed on 522 CMR 7.01(2) shall be inspected internally biennially thereafter by either ~~by a~~ District Engineering Inspector or an Authorized Inspector.

If the installation is found to comply with 522 CMR 7.00, the Department shall issue a Certificate stating the pressure at which the tank will be permitted to operate.

(b) Every tank which has been inspected by a District Engineering Inspector shall be given a ~~Massachusetts number upon a metal tag wired to the tank~~ ~~and noncorrosive metal tag not less than one inch in height attached to the tank~~ with a noncorrosive metal wire secured with a lead seal. Only a District Engineering Inspector may remove the Mass Tag.

(2) A tank which has been relocated shall require a first inspection by a District Engineering Inspector.

(32) Ultrasonic Inspections.

Pursuant to MGL c. 146, § 39, ~~Ultrasonic~~ thickness determination shall be permitted in lieu of, or in conjunction with, Internal Inspection for Air Tanks or other receptacles of 36 inches diameter or less. Thickness measurements shall be made in at least eight areas: two on each head and two on both the top and bottom portions of the shell. Thickness determinations indicating significant reduction in material thickness over a general area shall be shown on the inspection report, as well as calculations for the reduction in allowable working pressure., as well as calculations for the reduction in allowable working pressure. The Authorized Inspector's employer or the Chief shall be responsible for the inspector's or the ultrasonic examiner's competency in the use of the ultrasonic thickness gauge and the examiner's signed report shall be attached to the Authorized Inspector's or District Engineering Inspector's inspection report. A hydrostatic test shall be applied if required by the Authorized Inspector or District Engineering Inspector. The pressure applied during the test shall be equal to one and one half times the pressure allowed on the air tank or other receptacle. A hammer test may also be applied if there is no pressure on the tank or receptacle.

A significant reduction in material is a reduction in material thinner than the minimum allowable thickness. If the thickness is reduced below the minimum allowable thickness, the vessel must either be repaired to bring the vessel to at least the minimum thickness or the maximum allowable pressure reduced based upon the new actual thickness minus the corrosion rate expected between inspections. The NBIC shall be used in determining the corrosion rate.

The examiner's signed report and the Authorized Inspector's inspection report shall be submitted in a format approved by the Department.

(34) Certificate to Be Posted. If the Air Tank is found to comply with 522 CMR, the Department shall issue to the Owner/User of said vessel a Certificate, provided the appropriate fees have been paid. Pursuant to M.G.L. c. 146, § 34, the Certificate ~~for an Air Tank~~ shall be protected from dirt, moisture, and contamination and shall be posted in a conspicuous place near where the tank specified therein is located. The Certificate for a portable Air Tank shall be kept with said Tank and shall be always accessible to the inspector. No Certificate shall be removed there from while the Certificate is in force unless the tank or its ~~appendages~~ Appurtenances becomes defective. In that case, it shall be removed by either ~~a District Engineering Inspector~~, or an Authorized Inspector.

(45) Riveted Air Tanks. In determining the maximum allowable working pressure on the shell of lap-riveted Air Tanks over ten years old, lowest factor of safety to be used shall be as follows:

- (a) 5.5 for tanks over ten and not over 15 years old
- (b) 5.75 for tanks over 15 and not over 20 years old.
- (c) 6 for tanks over 20 years old.

Stamping shall comply with Section VIII.

No piping, drains, safety valves, pressure gauges or other Appurtenances shall be connected to threaded openings required for inspection and cleanout purposes. Flanged and/or threaded connections from which piping, instruments, or similar attachments can be removed may be used in place of the required inspection openings in accordance with Section VIII of the ASME ~~Boiler~~Boiler and Pressure Vessel Code.

7.05: Pressure Relief Valves

(1) All pressure relief valves on air tanks must conform to the ASME and National Board Codes as adopted by this regulation.

~~A pressure relief valve constructed in accordance with 522 CMR for use with steam may be used for air and its capacity in terms of cubic feet of air per minute shall be found by using the following: when not over three inch size and having a capacity in pounds per hour marked on it by the maker, may be used for air and its capacity in terms of cubic feet of free air per minute shall be found by multiplying the capacity in pounds of steam per hour by .325. This rule shall only apply when the pressure relief valve is set to blow at a pressure not lower than that marked in it by the manufacturer of the valve.~~

(23) All tanks, the contents of which are likely to cause interference with the operation of a pressure relief valve if attached directly to the tank, shall have the pressure relief valve connected in such a manner as to avoid such interference. Intercoolers and aftercoolers shall not be classed as primary vessels but shall be protected by adequate pressure relief valves.

(34) When the pressure relief valve covered by this regulation is exposed to the elements and freezing temperatures they shall be located on the discharge pipe from the compressor as near to the compressor as practical.

7.06: Gauges, and Drains, and Saddles

(1) Pressure Gauge.

(a) Every air compressor system shall have a pressure gauge connected in a manner that the pressure gauge cannot be shut off from the tank except by a cock with T or lever handle, which shall be placed on the pipe near the pressure gauge. Gauge connections shall be of brass pipe and fitting or copper tubing so connected to the system that they will not be exposed to high temperatures due to compression. The minimum copper tubing size used shall be 1/8".

(b) The dial of the pressure gauge shall be graduated to not less than one and one half times the maximum pressure allowed on the tank.

(2) Test Gauge Connection.

The Owner/User of the air tank shall install a test gauge connection at the request of the District Engineering Inspector or Authorized Inspector. ~~Each air compressor system shall be provided with a 1/4 inch pipe size connection for attaching the test gauge when the system is in service, so that the accuracy of the pressure gauge can be ascertained.~~

~~— The calibrated test gauge connection shall consist of a 1/4 inch pipe size brasscock with T or lever handle and female thread and shall be connected to the pressure gauge piping in such a manner that nothing shall obstruct the attachment of the test gauge while the tank is in service.~~

(3) Bottom Drain Pipe.

Each tank shall have a bottom drain pipe fitted with a valve or cock, of the straightway type, in direct connection with lowest water space practicable. The minimum size of pipe and fittings shall be 1/2 inch except for tanks 20 inches in diameter or less, in which the minimum size of such pipe and fitting shall be 1/4 inch iron pipe size. If a plug cock is used, the plug shall be held in place with a guard or gland.

7.07: Welded Repairs, Major Repairs, Alterations

No Repairs or Alterations shall be done by the welding process without the prior approval of an Authorized Inspector. All reconstruction including Repairs and Alterations performed to bring the vessel to the original code of construction shall be done in accordance with the NBIC.

In no case shall heat be used to bring the metal to a dull red color around an inspection or other opening for removing threaded attachments. ~~Evidence of brining the metal to a dull red color may require the decommissioning of the vessel until supporting documentation is submitted to the Board by a Massachusetts registered Professional Engineer.~~

(3) In accordance with the provisions of M.G.L. c. 146, § 2, the Board of Boiler Rules herewith

adopts by reference the 1998 A.S.M.E. Boiler and Pressure Vessel Code Section VIII Division 1, with 1999 addenda.

7.02: Corrosion Protection

Every air tank shall be provided with tapped openings for drains at the lowest point practicable. The minimum size of such openings shall be 1/2 " except for tanks 20" diameter or less, in which case the minimum size of such opening shall be 1/4 ". In the case of vertical tanks the bottom head, if dished, must have the pressure on the concave side to insure complete drainage.

7.03: Stamping

(1) Every air tank shall conform in all details with 522 CMR 7.00 and when so constructed shall be stamped as provided in Pars. UG 115 and UG 116 UG 117 UG 118 UG 119.

(2) A manufacturer who desires to construct air tanks for use in Massachusetts shall make written application to the Board of Boiler Rules for permission to construct such tanks and receive written authority from the Board before taking any steps toward furnishing tanks within the scope of 522 CMR 7.00 for use in Massachusetts.

The manufacturer shall furnish the Board such information as may be required to determine that he has the equipment and is otherwise qualified to fabricate tanks by the methods covered by his application and has made arrangements for shop inspection as required by 522 CMR 7.00. A facsimile of the proposed stamping shall accompany the application.

(3) Each tank inspected by a qualified inspector in accordance with Par. UG 91 shall bear the stamping of the National Board of Pressure Vessel Inspectors and the National Board number or the words MASS STANDARD abbreviated to read MASS STD and the MASS STD number.

(4) A "part" of an air tank requiring inspection shall bear the stamping of the National Board of Pressure Vessel Inspectors or the words MASSACHUSETTS STANDARD abbreviated to read MASS STD.

7.04: Data Reports

(1) A data report on forms to be approved by the Division of Inspection of the Department of Public Safety, shall be forwarded by the builder to the Chief of Inspections of such Department for each air tank stamped MASS STD before the tank is shipped from the shop of the builder.

(2) Data reports for air tanks stamped with the symbols of The American Society of Mechanical Engineers and the National Board of Pressure Vessel Inspectors but without MASS STD stamping shall be filed in accordance with National Board Regulations.

7.05: UM Stamping

(1) Air tanks that are stamped or have nameplates in accordance with paragraph UG 119 and

which have the ASME official code of UM symbol as shown in figure UG-116(b) and with the additional information required by paragraph UG-116(b), and which are constructed in accordance with the provisions in paragraph U-1H with the exceptions and conditions delineated in 522 CMR 7.05(2) and (3), will be acceptable for use within the Commonwealth of Massachusetts provided that the air tank does not

~~(a) contain more than five cubic feet of compressed air~~

~~(b) exceed 250 p.s.i.g. design pressure.~~

~~(2) Manufacturers of air tanks as defined in 522 CMR 7.05(1) must register with the Commonwealth of Massachusetts, Department of Public Safety, Division of Inspection, Engineering Section, before producing any air tanks that will be stamped UM for use within the commonwealth and annually thereafter. The following notarized information shall be furnished to the department. In the event of any changes in the information that is required, such changes, properly notarized, shall be submitted to the department within 30 days of the change.~~

~~(a) Name and legal address of the company or corporation.~~

~~(b) Name and legal address of the officers of the company, corporation or partnership.~~

~~(c) The name and address of the third party inspection agency and the authorized inspector.~~

~~(d) Two sets of each of the following, all to be signed and stamped with the seal of a Massachusetts Registered Professional Engineer with recognized competence in the fields of pressure vessel design and welding engineering:~~

~~1. Detailed drawings of the tank, heads, joint geometry, penetrations, supports, girth and longitudinal joints.~~

~~2. A full and complete set of calculations as required by the ASME code in simple arithmetic or algebra (no computer calculations).~~

~~3. Approved welding procedures as required by Section VIII of ASME (by third party inspection agency).~~

~~4. A U-3 form for each tank to be shipped into Massachusetts.~~

~~(3) Manufacturers that produce air receivers as defined in 522 CMR 7.05(1) and (2) must also agree to bear the full expense of a two man survey team of District Engineering Inspectors, employed by the Commonwealth of Massachusetts, for the certification of their shop. An annual re-survey of the shop may be made on a "surprise basis" also at the full expense of the manufacturer. An annual report must be submitted by the manufacturer, to the department, certified by his third party inspection agency that full compliance with his manufacturer's written procedures has been maintained.~~

CHAPTER 8.00: EXISTING AIR TANKS

8.01: Scope

~~522 CMR 8.00 applies to air tanks now or hereafter installed unless otherwise indicated by a note preceding a paragraph.~~

~~No regulations for the construction of air tanks are included in 522 CMR 8.00.~~

~~Tanks containing air and oil for the operation of automobile lifts or hydraulic machinery are exempt from the periodical inspection requirements but are subject to the requirements of 522 CMR 8.07(1).~~

8.02: Installation

~~(1) All tanks shall be available for complete external inspection and shall be so installed that there will be not less than 12" between the tank and any floor, wall, ceiling or other obstruction, except where a tank is attached to a portable compressor by means of straps and is removable for complete inspection.~~

~~(2) In case of vertical tanks the bottom head if dished must have the pressure on the concave side to insure complete drainage.~~

8.03: Protective Devices

~~All tanks shall be protected by such safety valves and indicating and controlling devices as will insure their safe operation. These devices shall be so constructed, located and installed that they cannot readily be rendered inoperative.~~

8.04: Attachment of Pipe and Fittings

~~NOTE: 522 CMR 8.04 applied to pipe and fittings hereafter installed.~~

~~No piping, drains, safety valves, pressure gages or other appurtenances shall be connected to~~

~~threaded openings required for inspection and cleanout purposes.~~

8.05: Safety Valves

~~Safety valves must be ASME and NB approved and stamped.~~

~~(1) Safety Valve Springs. Safety valve springs shall not be adjusted to carry more than 10% greater pressure than that for which the springs were made.~~

~~(2) Safety Valve Set Pressure. At least one safety valve at each location where safety valves are required shall be set to operate at or below the maximum allowable working pressure.~~

~~(3) Safety Valve Relieving Capacity Required.~~

~~(a) The relieving capacity of the safety valve or valves shall be sufficient to prevent a rise of pressure in the system of more than 10% above the maximum allowable working pressure.~~

~~(b) The minimum capacity of a safety valve or valves required shall be governed by the pressure allowed and by the maximum rating (sea level pressure and 60° F) of the compressor which shall be the piston displacement in cubic feet per minute at the maximum speed of the air compressor. In the case of multi-stage compressors only the piston displacement of the first stage cylinder shall be used.~~

~~(c) The minimum safety valve relieving capacity required for a rotary compressor shall be based on the compressor manufacturer's rating.~~

~~(4) Safety Valve Capacity Means of Determining.~~

~~(a) When a bevel seat safety valve is constructed in accordance with 522 CMR 8.00, except that it does not bear the capacity marking required by 522 CMR 8.05(4)(c), the acceptable capacity shall be that found in 522 CMR 8.05: *Table 1* for bevel seat safety valves.~~

~~(b) In applying 522 CMR 8.05: *Table 1* to flat seat safety valves marked "FLAT SEAT" by the maker but without the capacity marking required by 522 CMR 8.05(4)(c) the capacity values found in 522 CMR 8.05: *Table 1* may be multiplied by 1.4.~~

~~(c) When a safety valve is constructed in accordance with 522 CMR 8.00 and the capacity in cubic feet of free air per minute is marked on it by the manufacturer, that capacity may be accepted providing the following information is also included in the marking:~~

~~1. Name or identifying trade mark of the manufacturer.~~

~~2. Size in inches (pipe size of valve inlet).~~

~~3. Pressure in pounds (pressure at which it is to blow).~~

~~4. Relieving capacity in cubic feet of free air per minute.~~

The marking may be stamped or cast on the casing or stamped or cast on a plate or plates securely fastened to the casing and shall be so marked that the marking will not be obliterated in service.

~~(d) A safety valve constructed in accordance with 522 CMR for use with steam, when not of over three inch size and having the capacity in pounds of steam per hour marked on it by the maker, may be used for air and its capacity in terms of cubic feet of free air per minute shall be found by multiplying the capacity in pounds of steam per hour by .325. This rule shall apply only when the safety valve is set to blow at a pressure not lower than that marked on it by the maker.~~

~~(5) Safety Valve Connection to System:~~

~~(a) Each safety valve shall have full size direct connection to an air compressor system. No valve or other device that can be positively closed against the flow from the compressor shall be placed between the safety valve and the compressor. When two or more safety valves are placed on one connection this connection shall have a cross sectional area equal to or greater than the combined area of these safety valves. All tanks, the contents of which are likely to cause interference with the operation of a safety valve if attached directly to the tank, shall have the safety valve connected in such manner as to avoid such interference. Intercoolers and aftercoolers shall not be classed as primary vessels but shall be protected by adequate safety valves. When the safety valves in the installations covered by 522 CMR 8.05(5)(b) and (c) are exposed to the elements and freezing temperatures they shall be located on the discharge pipe from the compressor as near the compressor as practical.~~

~~(b) When the installation consists of one tank and one compressor the safety valve may be installed on the discharge pipe from the compressor or on the tank or near the tank on its outlet pipe.~~

~~(c) When two or more tanks are used with one compressor and air passes through the first tank known as the primary tank, the safety valve may be installed on the discharge pipe from the compressor or on the primary tank or near the primary tank on its outlet pipe.~~

~~(d) When two or more tanks allowed the same working pressure receive air direct from a compressor (primary tanks) the safety valve shall be installed on the discharge pipe from the compressor as close to the compressor as practical.~~

~~(e) When two or more compressors are discharging into a common main, the safety valve shall be installed on the discharge pipe from each compressor as close to the compressor as practical.~~

~~NOTE: Rupture disk requirements in 522 CMR 8.04(5)(f) apply only to tanks hereafter installed.~~

~~(f) When two or more tanks allowed different working pressure are connected to the same system, a reducing valve shall be placed in the line to the tanks allowed the lower pressure, with a safety valve and an approved rupture disk or safety valve or valves of a capacity amounting to the maximum capacity of the reducing valve shall be provided on the line between the reducing valve and the tank. The inlet area of the safety valve and the pipe size of the rupture disk shall not be less than that of the line to which they are attached and both protective devices shall have~~

full size independent connection to the line. The safety valve shall be set to operate at or below the maximum pressure allowed on the reduced pressure tank and protected from the elements when exposed to freezing temperatures.

~~The rupture disk bursting pressure shall be at least 10% and not over 20% higher than the pressure allowed on the reduced pressure tank.~~

~~The point of discharge of the rupture disk shall be carried to a safe place and all piping arranged to prevent accumulation of water on either side of the disk.~~

~~(6) Safety Valve Escape Pipe. When an escape pipe is used the point of discharge shall be carried to a safe place and no valve of any description shall be placed on the escape pipe between the safety valve and the atmosphere.~~

~~The cross sectional area of an escape pipe shall be greater than the outlet area of the safety valve or valves discharging through it, and at least equal to the full volume of air discharged from the safety valve or valves. There shall not in any case be any back pressure from the discharge pipe to the disk.~~

~~If an elbow is used it shall be located close to the safety valve outlet or the escape pipe shall be securely anchored or supported. An escape pipe shall be fitted with an open drain to prevent water from lodging in the safety valve or escape pipe.~~

~~(7) Monthly Test of Safety Valve. Each safety valve shall be tested at least once a month by raising the disk from the seat.~~

TABLE 1

GUARANTEED MAXIMUM FREE AIR SUPPLIED IN CUBIC

FEET PER MINUTE FOR DIFFERENT SIZES OF BEVEL SEATED

SAFETY VALVES AT STATED PRESSURES

Diameter of valve	Gage Pressure															
	50	100	150	200	250	300	350	400	500	600	800	1000	1200	1600	2000	2400
1/4	12	20	27	33	38	43	48	53	61	70	84	97	109	128	147	160
3/8	17	27	36	44	51	58	65	72	83	95	115	133	149	176	197	215
1/2	20	32	42	51	59	67	74	111	129	147	177	205	230	270	304	330
5/8	37	59	78	96	112	127	141	176	224	232	242	346	386	423	474	518
1	58	94	124	152	178	202	224	248	286	324	390	450	500	586	...	...
1 1/4	84	135	180	221	259	293	325	352	400	443	509	...	...	...	...	...
1 1/2	114	186	248	302	354	400	444	478	528	568	634	...	...	...	...	...
2	189	306	410	501	592	668	741	...	...	...	...	...	...	...	...	...
2 1/2	282	457	613	750	880	998	1114	...	...	...	...	...	...	...	...	...
3	393	638	856	1050	1230	1398	1557	...	...	...	...	...	...	...	...	...

522 CMR 8.00: RESERVED

CHAPTER 522 CMR 9.00: REFRIGERATION AND AIR CONDITIONING SYSTEMS

9.01: General Provisions

(1) Requirements for Inspection. Whoever owns or uses or causes to be used a refrigeration or air conditioning system that comes within the scope of M.G.L. c. 146, § 45A, shall make application for inspection to the Chief of Inspections on forms furnished by the department. The owner or user shall give his name and address and the location of the refrigeration or air conditioning system and return same to the department. The minimum fee for each inspection made by the division under 522 CMR 9.01 shall be \$40.00 and an additional fee of \$1.00 shall be charged for each ton above 20 tons; provided that the maximum fee shall be \$100.

(2) Annual Inspections. When a refrigeration or air conditioning system is installed a field inspection shall be made before it is put into service and the refrigeration or air conditioning system shall be inspected annually thereafter.

(3) Prescribed Pressure. A refrigeration or air conditioning system shall not be operated in excess of the prescribed pressure. If the refrigeration or air conditioning system is constructed and installed in accordance with the rules prescribed by the Board of Boiler Rules, the inspector shall issue a certificate stating the maximum pressure at which the system will be permitted to operate. (a) Every refrigeration or air conditioning system which has been inspected by the Division of Inspection shall be given a serial number upon a metal tag together with a symbol representing the seal of the Commonwealth preceding and following the number. The tag shall be held by

~~non-ferrous wire in a conspicuous place on the unit and no person except a District Engineering Inspector of the Division of Inspection shall remove the tag.~~

~~(b) Authorized insurance companies shall be furnished tag numbers by the Engineering section of the Division of Inspection for refrigeration and air conditioning systems. The authorized insurance companies shall furnish their own tags upon which shall be the tag number. The dimensions of the tag shall be that authorized by the board. The minimum size of the dies for stamping the tag shall be 5/16". The tag shall be made of non-ferrous metal and attached in a conspicuous place on the unit.~~

~~(4) Form of Certificate. The form of certificate shall be that authorized by the Board of Boiler Rules.~~

~~(5) Certificate to Be Posted. The certificate of inspection for a refrigeration or air conditioning system shall be posted and protected from dirt, water, and other deleterious effects in a conspicuous place near the compressor of the refrigeration or air conditioning system specified therein. It shall not be removed therefrom while the certificate is in force, unless the system or its appurtenances becomes defective, when it shall be removed by a District Engineering Inspector of the Division of Inspection of the Department of Public Safety or by a commissioned inspector who holds a Certificate of Competency as Inspector of Steam Boilers, to inspect pressure vessels issued by the Division of Inspection of the Department of Public Safety as provided by M.G.L. c. 146, § 62.~~

~~(6) Reports of Insurance Companies. Every insurance company shall forward to the Chief within 14 days after each inspection reports of all refrigeration or air conditioning systems inspected by it. Such reports shall be made on forms approved by the Chief of Inspections and shall contain all orders made by the company regarding such systems.~~

~~(7) Insurance Companies Shall Report New, Canceled or Suspended Risks. All insurance companies shall notify the Chief of Inspections within 14 days on forms approved by the Chief of Inspections of all refrigeration and air conditioning system risks written, canceled, not renewed or suspended because of unsafe conditions.~~

~~(8) Miscellaneous. Words underscored in the text have been specifically defined in 522 CMR 9.03 and are used in accordance with those definitions.~~

~~(9) Welding. All welding done on any refrigeration system or piping covered by 522 CMR 9.00 shall be performed by a welder qualified according to Section IX of the A.S.M.E. Code.~~

~~(10) Electrical. A person holding a license as a refrigeration technician may connect or disconnect for the purpose of installation, alteration, repair or replacement, any device or control required by rules and regulations of the board to be a part of a refrigeration or air conditioning installation, or being an integral part of the refrigeration or air conditioning equipment at the connection on such device, control or part to be repaired or replaced, from the first disconnect in. The first disconnect being the wall plug or nearest electrical disconnect to the refrigeration or air conditioning equipment. All electrical work shall be in accordance with the Massachusetts~~

~~Electrical Code.~~

9.0201: Scope

(1) Scope. The application of 522 CMR 9.00 is intended to ~~i~~ensure the safe design, construction, installation, operation, and inspection of every refrigeration and air conditioning system that comes within scope of M.G.L. c. 146, § 45A.

(2) Purpose. The purpose of 522 CMR 9.00 is to provide reasonable safety for life, limb, health and property by adopting such rules and regulations in accordance with nationally recognized standards of engineering practice which will properly influence future progress and development in refrigeration and air conditioning systems.

(3) Requirements. The requirements of 522 CMR 9.00 shall apply to all refrigeration and air conditioning systems and appurtenances ~~installations~~ that come within the scope of M.G.L. c. 146, § 45A: ~~including the following:~~

(a) Systems in railway trains;

(b) Systems in motor vehicles;

(c) Systems in private residences;

(d) Systems in apartment houses of less than five apartments;

(e) Systems under the jurisdiction of the United States Government;

(f) ~~Ⓐ~~ Agricultural, horticultural or floricultural purposes; and

(g) Systems having less than 20 tons capacity. ~~unless such system has been inspected by the Division and a Certificate has been issued therefor or unless such system is insured by and subject to periodical inspection by a company authorized to insure Pressure Vessels in the Commonwealth and a Certificate has been issued therefor.~~

~~(4) Equipment. Equipment listed in 522 CMR 9.03(10) and recognized by the Board of Boiler Rules is deemed to meet the requirements of 522 CMR 9.00 or equivalent, for the refrigerant or refrigerants for which such equipment is designed.~~

~~(45) Exceptions. In cases of practical difficulty or unnecessary hardship, the Board of Boiler Rules may grant exceptions from the literal requirements of 522 CMR 9.00, or permit the use of other devices or methods through the variance process in 522 CMR 1.04 when it is clearly evident the equivalent protection is thereby secured.~~

~~(6) Ton of Refrigeration. Is the removal of heat at a rate of 200 BTU per 522 CMR 9.00 one ton~~

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of refrigeration is equal to one horse power or one horse power is equal to one ton of refrigeration.

~~(547)~~ Existing Installations. The following rules apply to all refrigeration and air conditioning systems which were in use or installed ready for use prior to the date of amendment of 522 CMR in 2016: All existing installations shall be equipped with pressure relief devices as are required by ASHRAE 15, and any modifications made to existing systems shall be in accordance with the rules for new installations. 522 CMR 9.01(5) applies to all refrigeration and air conditioning systems which were in use or installed ready for use prior to the date upon which the rules adopted by the Board. All existing installations shall be equipped with pressure relief devices as are required by ASHRAE 15-2013 Safety Standards for Refrigeration Systems. Any modifications made to existing systems shall be in accordance with the rules for new installations.

~~(658)~~ Field Inspections. Field inspections of refrigeration and air conditioning systems in Massachusetts shall be made only by District Engineering Inspectors in the employ of the Division of Inspection of the Department of Public Safety, or by a commissioned inspector holding a certificate of competency issued by the Department of Public Safety of the Commonwealth of Massachusetts. All First Certificate inspections must be performed by an Authorized Inspector or a District Engineering Inspector before the refrigeration and air conditioning systems are put into service. Field inspections of refrigeration and air conditioning systems in Massachusetts shall be made annually thereafter by a District Engineering Inspector or an Authorized Inspector.

9.02: Construction

All Refrigeration Systems under the scope of this section shall be initially constructed in accordance with the ASHRAE 15 standard.

±

9.03: Installation

In accordance with the provisions of M.G.L. c. 146, § 2, the Board herewith adopts the ASHRAE 15 Safety Standard for Refrigeration Systems and ASHRAE 34 Designation and Safety Classification of Refrigerants for the installation of Pressure Vessel in Refrigeration Systems.

9.04: Inspection

(1) Requirements for Inspection.

Whoever owns or uses or causes to be used a refrigeration or air conditioning system that comes within the scope of M.G.L. c. 146, § 45A, shall make application for inspection to the Chief on forms furnished by the Department. The Owner/User shall give their name and address and the location of the refrigeration or air conditioning system, along with any other information required by the Department, and return same to the Department. The minimum fee for each inspection made by the Division under 522 CMR 9.01 shall be

set according to the fee schedule as set forth by the Commissioner of Administration and Finance in 801 CMR 4.02.

(2) Annual Inspections.

When a refrigeration or air conditioning system is installed, a field inspection shall be made before it is put into service and the refrigeration or air conditioning system shall be inspected annually thereafter by the Authorized Inspector or District Engineering Inspector.

Refrigerant detector(s), alarm(s) and the refrigeration mechanical room ventilating systems shall be tested annually and in accordance with manufacturer's specifications. Records supporting that such periodic testing was performed on refrigeration systems 20 tons capacity or greater shall be made available upon request by the Authorized Inspector or District Engineering Inspector during the annual inspection

(3) Prescribed Pressure.

A refrigeration or air conditioning system shall not be operated in excess of the prescribed pressure. If the refrigeration or air conditioning system is constructed and installed in accordance with the rules prescribed by the Board, the District Engineering Inspector or Authorized Inspector shall issue a Certificate stating the maximum pressure at which the system will be permitted to operate.

(4) Massachusetts Tag Number.

~~(a) Every refrigeration or air conditioning system which has been inspected by the Division shall be given a serial number upon a metal tag together with a symbol representing the seal of the Commonwealth. The tag shall be held by non-ferrous wire in a conspicuous place on the unit and no person except a District Engineering Inspector shall remove the tag.~~

~~(b) Authorized insurance companies shall be furnished tag numbers by the Chief for refrigeration and air conditioning systems. The authorized insurance companies shall furnish their own tags upon which shall be the tag number. The dimensions of the tag shall be that authorized by the Board. The minimum size of the dies for stamping the tag shall be 5/16". The tag shall be made of non-ferrous metal and attached in a conspicuous place on the unit.~~

(5) Certificate to Be Posted.

The Certificate for a refrigeration or air conditioning system shall be posted and protected from dirt, water, and other deleterious effects in a conspicuous place near the compressor of the refrigeration or air conditioning system specified therein. It shall not be removed therefrom while the Certificate is in force, unless the system or its Appurtenances

becomes defective, when it shall be removed by a District Engineering Inspector or Authorized Inspector.

~~(65) Reports of Insurance Companies of Inspection by Insurers.~~

Every insurance company shall forward to the Chief within 14 days after each inspection reports of all refrigeration or air conditioning systems inspected by it. Such reports shall be made in a format approved by the Chief and shall contain all ~~orders~~ requirements made by the company regarding such systems.

~~(7) Insurance Company Reporting.~~

Insurance companies shall report new, canceled or suspended risks. All insurance companies shall notify the Chief within 14 days in a format approved by the Chief of all refrigeration and air conditioning system risks written, canceled, not renewed or suspended because of unsafe conditions.

Insurance Company shall report location and owners information of all refrigeration systems which use anhydrous ammonia as the refrigerant to the Chief, detailing pounds of refrigerant per system.

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~~(86) Welding.~~

All welding done on any Refrigeration System or piping covered by 522 CMR 9.00 shall be performed by a welder qualified according to Section IX of the ASME Code.

~~(97) Electrical.~~

A person holding a license as a refrigeration technician may connect or disconnect for the purpose of installation, Alteration, Repair or replacement, any device or control required by rules and regulations of the Board to be a part of a refrigeration or air conditioning installation, or being an integral part of the refrigeration or air conditioning equipment at the connection on such device, control or part to be repaired or replaced, from the first disconnect in. The first disconnect is the wall plug or nearest electrical disconnect to the refrigeration or air conditioning equipment. ~~All electrical work shall be in accordance with the Massachusetts Electrical Code.~~

~~(408) Plumbing.~~

An individual who is licensed in compliance with M.G.L. c. 146, § 85 as a refrigeration technician may connect or disconnect for the purpose of alteration, repair or replacement of controls downstream of the equipment gas shutoff valve any device or control that is regulated by 522 CMR or is an integral part of the refrigeration or air conditioning equipment. ~~All fuel gas piping shall be installed by said licensed technician in compliance with 248 CMR 3.00 through 11.00.~~

~~Approved means sanctioned or accepted by the Board of Boiler Rules.~~

~~An Approved Nationally Recognized Testing Laboratory is one acceptable to the Board of Boiler Rules, that provides uniform testing and examination procedures under established standards, is properly organized, equipped, and qualified for testing, and has a follow-up inspection service of the current production of the listed products.~~

~~Authorized Manufacturer. A manufacturer who has registered with the Board of Boiler Rules and has been authorized by the Board to build pressure vessels for use in the Commonwealth of Massachusetts.~~

~~Commissioned Inspector:~~

~~(a) A District Engineering Inspector employed by the Division of Inspection, Department of Public Safety, Commonwealth of Massachusetts, or~~

~~(b) An inspector holding a Certificate of Competency as a boiler inspector, issued him by the Division of Inspection to field inspect pressure vessels within the Commonwealth or to make shop inspections in the shop of authorized manufacturers while employed by the authorized insurance company named on the certificate, or~~

~~(c) An inspector employed by an authorized insurance company who holds a current commission issued him by the National Board, or such other inspectors holding National Board Commissions as are approved by the Chief of Inspections.~~

~~Machinery Room as required by 522 CMR 9.90 is a room in which a refrigerating system is permanently installed and operated but not including evaporators located in a cold storage room, refrigerator box, air cooled space, or other enclosed space. Closets solely contained within, and opening only into a room shall not be considered machinery rooms but shall be considered a part of the machinery room in which they are contained or open into. It is not the intent of this definition to cause the space in which a self-contained system is located to be classified as a machinery room. (See 522 CMR 9.90.)~~

~~Machinery Room, Class T as required by 522 CMR 9.90 is a room having machinery but no flame producing apparatus permanently installed and operated and also conforming to the following:~~

~~(a) Any doors, communicating with the building, shall be approved self-closing, tight-fitting fire doors.~~

~~(b) Walls, floor and ceiling shall be tight and of not less than one-hour fire-resistive construction.~~

~~(c) It shall have an exit door which opens directly to the outer air or through a vestibule type exit equipped with self-closing, tight fitting doors.~~

~~(d) Exterior openings, if present, shall not be under any fire escape or any open stairway.~~

~~(e) All pipes piercing the interior walls, ceiling or floor of such room shall be tightly sealed to the walls, ceiling, or floor through which they pass.~~

~~(f) Emergency remote controls to stop the action of the refrigerant compressor shall be provided and located immediately outside the machinery room.~~

~~(g) An independent mechanical means shall be provided for ventilation. (See 522 CMR 9.03(11)(e).)~~

~~(h) Emergency remote controls for the mechanical means of ventilation shall be provided and located outside the machinery room.~~

~~Refrigerating System is a combination of interconnected refrigerant-containing parts constituting one closed refrigerant circuit in which a refrigerant is circulated for the purpose of extracting heat. (See 522 CMR 9.05 for classification of refrigerating systems by type.)~~

~~(a) Absorption System is a refrigerating system in which the gas evolved in the evaporator is taken up by an absorber or adsorber.~~

~~(b) Sealed Absorption System is a unit system (or Group 2 refrigerants only, in which all refrigerant-containing parts are made permanently tight by welding or brazing against refrigerant loss. (This is a restrictive definition for the purposes of 522 CMR 9.00, as used in 522 CMR 9.00.) (See 522 CMR 9.03(39)(a).)~~

~~(c) Self-Contained System is a complete factory-made and factory-tested system in a suitable frame or enclosure which is fabricated and shipped in one or more sections and in which no refrigerant-containing parts are connected in the field other than by companion or block valves.~~

~~(d) Unit System is a self-contained system which has been assembled and tested prior to its installation and which is installed without connecting any refrigerant-containing parts. A unit system may include factory-assembled companion or block valves.~~

9.00: Safety Code for Mechanical Refrigeration

~~(1) Scope and Purpose.~~

~~(a) In accordance with the provisions of M.G.L. c. 146, § 2, the Board of Boiler Rules herewith adopts by reference The 1997 ANSI/ASHRAE Safety code.~~

~~(b) The application of this Code is intended to assure the safe design, construction, installation, operation, and inspection of every refrigerating system employing a fluid which normally is vaporized and liquefied in its refrigerating cycle, when employed under the occupancy classifications listed in the ANSI/ASHRAE safety code.~~

~~(c) The provisions of this Code are not intended to apply to the use of water or air as a refrigerant, nor to gas bulk storage tanks that are not permanently connected to a refrigerating system, nor to refrigerating systems installed on railroad cars, motor vehicles, motor drawn vehicles or on shipboard.~~

~~(2) General Notes.~~

~~EDITOR'S NOTE: ASME Codes when adopted in their entirety by the Board of Boiler Rules are not published by the State Secretary in the Code of Massachusetts Regulations.~~

CHAPTER 10.00: MATERIAL SPECIFICATIONS

10.01: Scope and Application

(1) In accordance with the provisions of M.G.L., c. 146, § 2, the Board ~~of Boiler Rules~~ herewith adopts by reference the ASME ~~Boiler~~Boiler and Pressure Vessel Code Section II, Materials, Parts A, B, C, and D, by reference MATERIAL SPECIFICATIONS, Parts A, B, C, and D 1998 edition, with 1999 addenda, formulated and published by the American Society of Mechanical Engineers, as ASME ~~BOILER AND PRESSURE VESSEL CODE, SECTION II.~~

(2) The ASME Boiler and Pressure Vessel Code Section II, Materials, Parts A, B, C, and D, ~~se~~ Material Specifications shall be applicable to the manufacture and construction of all ~~steam~~ High Pressure/Power Boilers, nuclear vessels and piping, Low Pressure/Heating Boilers, and unfired ~~pressure Pressure vessels Vessels~~ subject to the provisions of M.G.L. c. 146.

~~(3) The amendments herein, including deletions and/or additional requirements, shall take effect six months after publication by the Secretary of the Commonwealth, provided, the Board may upon request, permit application of the amended rules, to installations made during said six months.~~

CHAPTER 522 CMR 11.00: WELDING SPECIFICATIONS

11.01: Scope and Application

(1) In accordance with the provisions of M.G.L. c. 146, §§ 2 and 35, the Board ~~of Boiler Rules~~ herewith adopts by reference the ASME ~~Boiler~~Boiler and Pressure Vessel Code Section IX, Welding and Brazing Qualifications, QUALIFICATION STANDARD FOR WELDING AND BRAZING PROCEDURES, WELDERS, BRAZERS, AND WELDING AND BRAZING OPERATORS, 1998, with 1999 addenda, formulated and published by the American Society of Mechanical Engineers as ASME ~~BOILER AND PRESSURE VESSEL CODE, SECTION IX.~~

(2) These ~~se~~ ASME Boiler and Pressure Vessel Code Section IX Standards shall be applicable to all High Pressure/Power Boilers, nuclear vessels and piping, Low Pressure/Heating Boilers, and unfired Pressure Vessels ~~all steam boilers, nuclear vessels and piping, and unfired pPressure~~

~~Vessels~~ subject to the provisions of M.G.L. c. 146.

~~(3) The amendments herein, including deletions and/or additional requirements, shall take effect six months after publication by the Secretary of the Commonwealth, provided, the Board may upon request, permit application of the amended rules, to installations made during said six months.~~

CHAPTER 522 CMR 12.00: FIBERGLASS-REINFORCED PLASTIC PRESSURE VESSELS

12.01: Scope and Application

(1) In accordance with the provisions of M.G.L. c. 146, § 2, the Board of ~~Boiler Rules~~ herewith adopts by reference the ASME ~~Boiler~~ and Pressure Vessel Code Section X, Fiber-Reinforced Plastic Pressure Vessels, Fiberglass Reinforced Plastic Pressure Vessels, 1998 Edition, with 1999 addenda, formulated and published by the American Society of Mechanical Engineers, as ASME ~~BOILER AND PRESSURE VESSEL CODE, SECTION X.~~

(2) The ASME Boiler and Pressure Vessel Code Section X~~522-CMR-12.00~~ shall be applicable to the Construction, Fabrication, Qualifying Designs and Procedures, Testing, Inspection, Marking, Stamping and Reports of Fiberglass-Reinforced Plastic Pressure Vessels as used for the storage of compressed air and gases used for refrigeration, subject to the provisions of M.G.L. c. 146.

CHAPTER 522 CMR 13.00: INSERVICE INSPECTION OF NUCLEAR POWER PLANT COMPONENTS- DIVISION I-RESERVED

13.01: Scope and Application

~~In accordance with the provisions of M.G.L. c. 146 as amended by St. 1975 c. 699, St. 1978 c. 34; M.G.L. c. 30, § 37; M.G.L. c. 30A, § 5; and M.G.L. c. 22, § 10A; the Board of ~~Boiler Rules~~ adopts RULES FOR INSERVICE INSPECTION OF NUCLEAR POWER PLANT COMPONENTS (BLR 12) as formulated and published by the American Society of Mechanical Engineers, Section XI, Division I, 1998 edition, with 1999 addenda. It is not reprinted here but is available from ASME, Order Department, 345 East 47th Street, New York, N.Y. 10017.~~

CHAPTER 522 CMR 14.00: RESERVED

CHAPTER 522 CMR 15.00: NATIONAL ~~BOILER~~ AND PRESSURE VESSEL BOARD INSPECTION CODE

15.01: Scope and Application

(1) In accordance with the provisions of M.G.L. c. 146 § 2, the Board adopts the NBIC as formulated and published, as it directly relates to ~~Boiler~~Boilers, Pressure Vessels and their Appurtenances.

(2) The NBIC applies to the inspection, installation, and alteration or repair of ~~Boiler~~Boiler and Pressure Vessels.

~~(3) The duties of the National Board Commissioned Inspector do not include the installation's compliance to other standards (environmental, construction, electrical, undefined industry standards) for which other regulatory agencies have authority and responsibility to oversee. See NBIC Part 1-1.4.1.~~

(43) Hydrostatic / Pressure Test Requirements. All Repairs and Routine Repairs shall be pressure tested. The District Engineering Inspector or Authorized Inspector shall ~~be consulted and~~ approve the pressure that is to be applied, in accordance to M.G.L. c. 146. Air or compressed gas pressure tests shall not be acceptable without the approval of the Chief or his designee. A vacuum test may be permitted if authorized by the ~~Authorized~~ Inspector.

~~(54) Inspector Presence. If the District Engineering Inspector cannot be present during a Routine Repair, the District Engineering Inspector or Authorized Inspector may waive the in process involvement provided that the repair company's designee and the Owner/User or his designee shall witness and document the results of the test. The results of the test shall be made available upon request by the Chief or his designee. If the District Engineering Inspector or Authorized Inspector cannot be present during a Routine Repair, the District Engineering Inspector or Authorized Inspector may waive the in process involvement on a case by case basis, provided the District Engineering Inspector or Authorized Inspector delegates the inspection responsibilities to the Engineer in Charge or the Owner/User's designee, and the "R" Certificate Holder determines that the routine repairs are acceptable to the Department where the pressure retaining item is installed. The District Engineering Inspector or Authorized Inspector must document the reason for his lack of involvement on the R-1 form under the Remarks section. The Engineer in Charge or the Owner/User's designee shall provide meaningful results to verify the integrity of the Routine Repair, as determined by the District Engineering Inspector or Authorized Inspector. If the in-process involvement is waived by the District Engineering Inspector or Authorized Inspector, the Engineer in Charge or the Owner/User's designee must witness the final inspection. The District Engineering Inspector or Authorized Inspector, with the knowledge and understanding of~~

jurisdictional requirements, shall be responsible for meeting jurisdictional requirements and the requirements of the NBIC.

(6) Routine Repairs. Routine repairs shall be as defined in the NBIC.

15.01: Scope and Application

In accordance with the provisions of M.G.L. c. 146 as amended by St. 1975 c. 699, St. 1978 c. 34; M.G.L. c. 30, § 37; M.G.L. c. 30A, § 5; and M.G.L. c. 22, § 10A; the Board of Boiler Rules adopts the 1998 NATIONAL BOILER AND PRESSURE VESSEL INSPECTION CODE, with 1999 addenda, as formulated and published.

Where differences occur between provisions in 522 CMR and the National Boiler and Pressure Vessel Inspection Code, the provisions of the Massachusetts Regulations shall apply.

CHAPTER 522 CMR 16.00: CONTROLS AND SAFETY DEVICES FOR AUTOMATICALLY FIRED BOILERS (ASME CODE CSD-1), PART CW: STEAM AND WATERSIDE CONTROL CONTROLS AND SAFETY DEVICES FOR AUTOMATICALLY FIRED BOILERS (ASME SAFETY CODE, NO. CSD-1-2009), PART CW STEAM AND WATERSIDE CONTROLS, 1977) UNITS OVER 200,000 BTU'S

16.01: Scope and Application

(1) In accordance with the provisions of M.G.L. c. 146, § 2, the Board herewith adopts the ASME CSD-1 -2009 Code for the Controls and Safety Devices for Automatically Fired BoilerBoilers, Part CW: Steam and Waterside Control.

(2) Requirements. 522 CMR 16.00 shall apply to boilers restricted to the following services:

- ~~(a) steam boilers over 3 HP constructed for pressures in excess of 15 psi;~~
- ~~(b) high temperature water boilers exceeding 160 psig operating pressure and/or 250°F operating temperature;~~
- ~~(c) steam heating boilers for operation at pressures not exceeding 15 psi (100 kPa) having a capacity of more than 207 pounds of steam per hour~~
- ~~(d) hot water heating boilers and hot water supply boilers for operation at:~~
 - ~~1. Pressures not exceeding 160 psi working pressure; or temperatures not exceeding 250°F (120°C), at or near the boiler outlet, except that when some of the wrought materials permitted by ASME Code Section IV are used, a lower temperature is specified;~~
 - ~~2. Having a capacity of more than 200,000 BTU output of the boiler nozzle;~~

16.02: NFPA 85 Boiler and Combustion Systems Hazards Code

(1) In accordance with the provisions of M.G.L. c. 146, § 2, the Board herewith adopts the NFPA 85 Boiler and Combustion Systems Hazards Code. NFPA 85 Boiler and Combustion Systems Hazards Code shall apply to all Boilers equal to or greater than 12.5 million BTU/hr.

(2) Requirements. 522 CMR 16.02 shall apply to Boilers restricted to the following services:

(a) Single burner Boilers, multiple burner Boilers, stokers, and atmospheric fluidized-bed Boilers with a fuel input rating of 12.5 million BTU/hr or greater, to pulverized fuel systems, to fired and unfired steam generators used to recover heat from combustion turbines [heat recovery steam generators (HRSGs)], and to other combustion turbine exhaust systems.

16.01: Automatic Low Water Fuel Cutoff and/or Combined Water Feeding Device

~~(1) General Requirements for Water Level Controls for all Boilers:~~

~~(a) Each low water fuel cutoff or combined feeder cutoff device shall conform to AND B136.1 and shall be accepted by a nationally recognized testing organization.~~

~~(b) Installation diagrams and instructions shall be furnished by the manufacturer.~~

~~(c) Low water fuel cutoff or combined feeder cutoff devices shall be located to provide safe access for cleaning, repairing, testing and inspection.~~

~~(d) The low water fuel cutoffs shall have a pressure rating at least equal to the set pressure of the safety valve or safety relief valve.~~

~~(e) In probe type low water cutoffs, an open circuit failure, break or disconnection of the electrical components or conductors in the safety circuit shall prevent continued operation of the firing mechanism.~~

~~(f) Alarms, when used, shall be distinctly audible above the ambient noise level, and may be used in conjunction with signal lights. They shall be located to alert the operator or an individual who has been instructed in what action to take when the alarm indicates that a potentially dangerous situation is developing.~~

~~(2) Requirements for Low Pressure Steam or Vapor System Boilers:~~

~~(a) Each automatically fired low pressure steam or vapor system boiler shall have at least one automatic low water fuel cutoff or combined feeder cutoff device. Boilers with a pumped condensate return shall have two such cutoff devices, each attached to separate connections. Each cutoff device shall be installed to prevent start-up and to cutoff the boiler fuel supply automatically when the surface of the water falls to a level not lower than the lowest visible part of the gauge glass. A water feeding device when used, shall be constructed and installed so that the water inlet valve cannot feed water into the boiler through the float chamber or its connections to the boiler. The water feeding device shall be located to supply requisite feedwater.~~

~~(b) When dual low water cutoff controls are used, the electrical circuit shall be connected in such a manner that either control will shut off the fuel supply to the boiler when a low water condition develops. One control shall be set to function ahead of the other. Functioning of the lower of the two controls shall cause safety shutdown (lockout) requiring manual reset. The manual reset may be incorporated in the lower cutoff control, or may be effected remotely. Where a reset device is separate or remote from the low water cutoff a means shall be provided to indicate that the low water cutoff had operated. The manual reset device may be the instantaneous type, or may include a time delay of not more than three minutes after the fuel has been cutoff.~~

(c) The cutoff device may be inserted internally or attached externally to a boiler. An external cutoff device may be connected to water column piping which shall be not less than one inch (26 mm) pipe size. When the cutoff device is connected to the boiler by pipe and fittings, no shutoff valves of any type shall be placed in the connecting piping and a cross or equivalent fitting shall be placed in the water piping connection at every right angle to facilitate cleaning and inspection. A full size drain valve and piping shall be placed on the bottom of the lowest cross.

(d) A low water fuel cutoff or combined feeder cutoff device may also be installed in the tapped openings available for attaching a water gauge glass direct to a boiler, provided the connections are made to the boiler with nonferrous tees or Y's not less than 1/2 inch (13 mm) pipe size between the boiler and the water gauge glass so that the water gauge glass is attached directly and as close as possible to the boiler; the run of tee or Y shall take the water glass fitting, and side outlet or branch of the tee or Y shall take the fuel cutoff water feeding device. The ends of the all nipples shall be reamed to full size diameter.

(e) Fuel cutoff or combined feeder cutoff devices embodying a separate chamber shall have a vertical drain pipe and a blowoff valve, not less than 3/4 inch (19mm) pipe size, located at the lowest point of the chamber or water equalizing pipe connections so that the chamber and the equalizing pipe can be flushed and the device tested.

(f) A system may incorporate a time delay component with the low water fuel cutoff device to prevent short cycling. This component shall not constrict any connecting piping, and the time delay shall not exceed the boiler manufacturer's recommended timing or 90 seconds, whichever is less. The device shall cut off the fuel supply when the water falls to the lowest visible part of the gauge glass.

(3) Requirements for Hot Water Heating Boilers.

(a) Each automatically fired hot water heating boiler except those installed in residences (as defined by the authority having jurisdiction) shall be protected by a low water fuel cutoff or combined feeder cutoff device suitable for hot water service (See also CW 200).

(b) Since there is no normal waterline to be maintained in a hot water boiler, the low water fuel cutoff can be located any place above the lowest safe permissible water level established by the boiler manufacturer.

(c) If the low water fuel cutoff or combined feeder cutoff is located in the system piping, it must be assured that the float chamber will drain properly under a low water condition; and the installation must be arranged to assure that if flow occurs in the float chamber, it will be in the upward direction.

(d) Functioning at the low water fuel cutoff or combined feeder cutoff due to a low water condition shall cause a safety shutdown (lockout) requiring manual reset. Where a reset device is separate or remote from the low water cutoff a means shall be provided to indicate that the low water cutoff had operated. The manual reset device may be the instantaneous type or may include a time delay.

(e) A means shall be provided for testing the operation of the device without resorting to draining the entire system. Such means shall not render the device unsafe or inoperable.

(f) The means for testing flow type cut off shall be by closing off the water supply, top and bottom, by means of a lever activated valve that is tied together and being able to be locked in the open position.

(4) Requirements for High Pressure Steam Boilers:

(a) Each automatically fired high pressure steam boiler, except miniature boilers, shall have at least two automatic low water fuel cutoff devices. Each cutoff device shall be installed to prevent startup and to cut off the boiler fuel supply automatically when the surface of the water falls to a level not lower than the lowest visible part of the gauge glass. One control shall be set to function ahead of the other. Each miniature boiler shall have at least one low water fuel cutoff device.

(b) Functioning of the lower of the two controls shall cause a safety shutdown (lockout) requiring manual reset. The manual reset may be incorporated in the lower cutoff control, or may be effected remotely. Where a reset device is separate or remote from the low water cutoff a means shall be provided to indicate that the low water cutoff had operated. The manual reset device may be of the instantaneous type, or may include a time delay of not more than three minutes after the fuel has been cut off.

(c) The fuel cutoff device may be inserted internally attached externally to the boiler. An external cutoff device may be attached on piping connections shall be at least one inch (26 mm) pipe size. If the low water fuel cutoff is connected to the boiler by pipe or fittings, no shutoff valves of any type shall be placed in such piping. A cross or equivalent fitting shall be placed in the water piping connection at every right angle to facilitate cleaning and inspection. Fuel cutoff devices embodying a separate chamber shall have a vertical drain pipe and a blowoff valve, not less than 1/4 inch (6.4 mm) pipe size, located at the lowest point of the chamber or water equalizing pipe connections so that the chamber and the equalizing pipe can be flushed and the device tested.

(d) A system may incorporate a time delay component with the low water fuel cutoff device to prevent short cycling. This component shall not constrict any connecting piping, and the time delay shall not exceed the boiler manufacturer's recommended timing or 90 seconds, whichever is less. The device shall cut off the fuel supply when the water falls to the lowest visible part of the gauge glass.

16.02: Flow Sensing Controls

Requirements for Flow Sensing Devices for Forced Circulation Boilers

(1) In lieu of the requirements for low water cutoffs in ~~522 CMR 16.01~~, a water tube or coil type boiler requiring forced circulation to prevent overheating and failure of the tubes or coils shall have an accepted device to prevent burner operation when the circulating flow is below a safe minimum.

~~(2) When there is a definitive waterline, a low water fuel cutoff as required in 522 CMR 16.01 shall be provided in addition to the sensing device required in 522 CMR 16.02(1).~~

~~(3) A flow sensing device shall be located to ensure that the sensing device shall not be activated if a relief condition occurs.~~

16.03: Pressure Controls

Requirements for Pressure Controls for Steam Boilers

~~(1) Each boiler control shall conform to AND-B136.1, and shall be accepted by a nationally recognized testing organization.~~

~~(2) Each automatically fired steam boiler or system of commonly connected steam boilers shall have at least one steam pressure control device which will shut off the fuel supply to each boiler or system of commonly connected boilers, when the steam pressure reaches a preset maximum operating pressure. This requirement does not preclude the use of additional operating control devices where required. Each limit and operating control shall have its own sensing element and operating switch. Provisions of 522 CMR 2.03(7) apply.~~

~~(3) In addition to the pressure control required in CW-399(b) each individual automatically fired steam boiler shall have a high steam pressure limit control that will prevent generation of steam pressure in excess of the maximum allowable pressure. Functioning of this control shall cause a safety shutdown (lockout) requiring manual reset. The manual reset may be incorporated in the pressure limit control, or may be effected remotely. Where the reset device is separate or remote from the pressure limit control a means shall be provided to indicate that the pressure limit control had operated.~~

~~(4) No shutoff valve of any type shall be placed in the steam pressure connection between the boiler and the high pressure limit control device.~~

~~(5) Each pressure control device shall be protected with a syphon, or equivalent means of maintaining a water seal, that will prevent steam from entering the control. The minimum size of a syphon shall be 1/4 inch (6.4 mm) standard pipe size. Ferrous and nonferrous tubing with an inside diameter at least equal to standard pipe sizes may be substituted for pipe. When a control incorporating a mercury switch is mounted on the syphon, the loop of the syphon shall be in a plane that is 90° (1.57 rad) from the plane of the mercury switch.~~

~~(6) Supply connections shall not be less than one fourth inch (6.4 mm) standard pipe size if the pipe is constructed of nonferrous material. Ferrous connections shall not be less than 1/2 inch (13 mm) pipe size. If the pipe is over five feet (1.5 m) long, the pipe size shall be one inch (26 mm). Ferrous and nonferrous tubing with an inside diameter at least equal to standard pipe sizes may be substituted for pipe.~~

~~(7) When multiple controls are mounted on or fed from a manifold, the manifold and common source connection to the boiler shall be at least 3/4 inch (19 mm) pipe size. Controls must be~~

individually piped from the manifold according to the provisions in 522 CMR 16.03(6).

(8) The upper set point limit of the pressure control selected shall not exceed the maximum allowable working pressure of the boiler.

16.04: Temperature Controls

Requirements for Temperature Controls for Hot Water Heating and Supply Boilers

(1) Each temperature control device shall conform to ~~AND B136.1~~ and shall be accepted by nationally recognized testing organization.

(2) Each automatically fired hot water boiler, or each system of commonly connected hot water boilers shall have at least one temperature actuated control to shut off the fuel supply when the system water reaches a preset maximum operating temperature. This requirement does not preclude the use of additional operation control devices where required. Each limit and operating control shall have its own sensory element and operating switch.

(3) In addition to the temperature control required in CW-400b, each individual automatically fired hot water boiler shall have a high temperature limit control that will prevent the water temperature from exceeding the maximum allowable temperature. Functioning of this control shall cause a shutdown (lockout) requiring manual reset. The manual reset may be incorporated in the temperature limit control, or may be effected remotely. Where a reset device is separate or remote from the temperature limit control, a means shall be provided to indicate that the temperature limit control had operated.

16.05: Safety and Safety Relief Valves

~~Requirements for Steam and Hot Water Heating Boilers~~ The safety and safety relief valves of all steam and hot water heating boilers shall conform to the ASME Boiler and Pressure Vessel Code, Section I or IV as applicable.

CHAPTER 522 CMR 17.00: PROCESS PIPING

17.01: Authorization

522 CMR 17.00 is authorized, formulated and adopted under M.G.L. c. 22, § 10A and c. 146, §§ 45A, 81 through 89.

17.02: Purpose

522 CMR 17.00 is necessary to protect the lives, property and ~~P~~public ~~S~~safety of the people of ~~Massachusetts~~the Commonwealth, and to help in the conservation of our natural resources and environment, by the proper installation, modification, and disassembly for re-use of ~~process~~ piping systems and/or equipment used to generate energy, heat, cooling, manufactured products, and for the conveyance and storage for liquids, solids, industrial gases and chemical and

petroleum products.

17.03: Limit of Jurisdiction

~~Process piping shall be deemed to include those systems used in the conveyance, storage, and processing of liquids, solids, and industrial type gases. Nothing in 522 CMR 17.00 shall be construed as applying to the Plumbing or Sprinkler Protection industries. However, specifically included as process piping systems shall be those industrial water and waste systems which have intervening equipment or devices (e.g. backflow preventers, tanks, pumps) prior to tying into a domestic or sanitary system.~~

17.04: Scope

~~The Board of Boiler Rules understand the engineering requirements deemed necessary for the safe design and installation of process piping systems. Therefore, all piping systems covered by 522 CMR 17.00 shall be constructed using (ANSI/ASME B 31.1) the American National Standard Code for Pressure Piping, 1998 Edition, with 1999 addenda, as published by the American Society of Mechanical Engineers, 345 East 47th Street, New York, N.Y.~~

All piping systems covered by 522 CMR 17.00 shall be constructed using the following standards:

For Power Piping: ANSI/ASME B31.1 -The American National Standard Code for Power Piping. -This is piping typically found in electric power generating stations, in industrial and institutional plants, geothermal heating systems, and central and district heating and cooling systems.

For Process Piping:- ANSI/ASME B31.3- The American National Standard Code for Process Piping. -This piping is typically found in petroleum refineries, chemical, pharmaceutical, textile, paper, semiconductor, and cryogenic plants, and related processing plants and terminals.

For Refrigeration Piping and Heat Transfer Components: -ANSI/ASME B31.5 -The American National Standard Code for Refrigeration Piping and Heat Transfer Components. -This piping is typically used for piping refrigerants and secondary coolants.

For Building Services Piping: -ANSI/ASME B31.9 -The American National Standard Code for Building Service Piping. -This piping is typically found in industrial, institutional, commercial, and public buildings, and in multi-unit residence, which does not require the range of sizes, pressures, and temperatures covered in B31.1.

CHAPTER 18.00: CONTINUING EDUCATION REQUIREMENTS ~~FOR ENGINEERS~~ AND FIREMEN

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18.01: Scope and Application

(1) Engineers and Firemen. In accordance with the provisions of ~~M.G.L. c. 146, § 49~~^{M.G.L. c. 146, § 49}, the Department of Public Safety (Department) shall promulgate regulations which shall require the renewal of such licenses every five years. All engineers and firemen licensed by the commonwealth to operate boilers shall demonstrate completion of 30 hours of continuing education at or through an institution or organization approved by the Commissioner of Public Safety, in consultation with the chief inspector, during each five-year period preceding each license renewal.

All engineers and firemen shall submit to the Department a certificate of completion from any department approved institution or organization that they have completed 30 hours of continuing education, when renewing their engineer's or fireman's license. The 30 hours of continuing education must be completed before an engineer or fireman licensee can re-new his or her license, in an active status.

Final certificate of completion shall be from one institution or organization for all hours required by statute. Approved organizations or institutions may provide credit to individuals who wish to transfer from one organization / institution to another in the middle of a course. The organization or institution may give credit to individuals provided they can provide verifiable proof that they participated in approved continuing education sessions.

Engineers and firemen must complete the full 30 hours of continuing education with the same institution or organization, whether or not said institution or organization may conduct the course at different locations. If an institution or organization can-not provide the full 30 hours to ensure license renewal, the engineer or fireman may transfer his or her continuing education training to another institution or organization provided they comply with 522 CMR 18.01.

An individual may transfer his or her continuing education training to another institution or organization. Upon transfer, the institution or organization which provided the continuing education shall provide the individual with a certificate evidencing the number of hours successfully completed by the individual at that institution. Other organizations or institutions shall accept this certificate as proof of the hours accumulated to date when issuing the final certificates of completion. Only final certificates of completions shall be accepted by the Department of Public Safety. Transfer certificates shall not be submitted to the Department.

Licenses not renewed at expiration date shall become void, and shall after one year be reinstated only by re-examination of the licensee. This provision does not apply to licenses renewed with an "inactive" status.

All Massachusetts Engineer and Fireman licensees, upon completion of 30 hours of continuing education will receive from that institution or organization a uniform certificate, approved by the Commissioner, which they will retain and furnish the same to the Department, if so requested. They may also receive matter, approved by the Commissioner or his/her designee, which must be affixed to their license application upon renewal.

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(2) Special-to-have-charge and Special-to-operate Licenses. Individuals licensed to operate boilers under a special-to-have-charge, or special-to-operate license shall demonstrate completion of six hours of continuing education at or through an institution or organization approved by the Commissioner, in consultation with the chief inspector, during each five year period preceding each license renewal.

18.02: Definitions

The terms defined in 522 CMR 1.02 are hereby adopted and incorporated for use in 522 CMR 18. In addition, the following terms as used in 522 CMR 18 are defined as follows:

Approved: Approved by the Commissioner of Public Safety, in consultation with the Chief of Inspections for the Department of Public Safety, which comply with 522 CMR 18.00.

A.S.M.E.: American Society of Mechanical Engineers.

Chief of Inspections: The Chief of Inspections for the Department of Public Safety.

Commissioner: The Commissioner of Public Safety.

Gas Turbine: A device using combustion gasses directly in a turbine. The basic components of a gas turbine consist of a compressor, combustor and turbine. Fuel used in a gas turbine is natural gas, high quality fuel oil, synthetic gas or liquefied coal.

Guest Speaker: Any individual who participates in the instruction of a continuing education program under the request and direct personal supervision of the duly licensed and registered instructor or monitor of any approved continuing education program for engineers and firemen.

Instructor: Any person who instructs any continuing education program for engineers or firemen. The Instructor shall hold the same grade of Massachusetts engineer or fireman license to the level of course they are instructing. An engineer or fireman will not be given credit for any programs or courses instructed by a person holding a lesser grade license, unless they are a guest speaker approved by the instructor or monitor. Instructors shall only be credited hours for the actual non-redundant time that they have spent actively participating in the instruction of the program.

Monitor: A Massachusetts engineer who oversees and has been appointed as the administrator for any approved continuing education program for engineers and firemen. It is not required that the monitor is physically present in each class. All Monitors must hold a Massachusetts Engineers license of equal or greater grade of the instructors of any approved program. Monitors shall only be credited hours for the actual non-redundant time that they have spent actively participating in the instruction or design of the program.

NBIC: National Board Inspection Code.

18.03: Requirements of Institutions or Organizations

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The following provisions are required in order for any institution or organization to have their continuing education program considered for approval:

(1) A copy of all curriculum, quizzes, training material, and certificate of completion to be used must be provided to the Department.

(2) Continuing education shall not be divided into training increment less than ~~four~~two hours, unless approved by the Commissioner.

(3) Curriculum must contain the minimum topics and associated hours for those topics as listed in ~~522 CMR 18.04~~522 CMR 18.04.

(4) All courses must be monitored by a Massachusetts engineer of equal or greater grade of Massachusetts license, who will verify by his or her signature on the certificate of completion, that all those issued a certificate of completion have fully participated in the program for which he or she have been issued a certificate. Instructors shall only be credited hours for the actual non-redundant time that they have spent actively participating in the instruction of the program.

(5) Method of Verification. Each program must provide a means to ensure certificate authenticity. Such means may include, but shall not be limited to:

- (a) Institution embossment of certificate
- (b) Computer data transfer of program participants
- (c) Signature verification
- (d) Numbering certificates

(6) Certificates of Completion ~~M~~must have the ~~F~~following:

- (a) Name of participant;
- (b) Address of participant;
- (c) Massachusetts license grade and number of participant;
- (d) Name and address of the institution or organization providing the continuing education;
- (e) A legible signature of a Massachusetts engineer verifying participant has completed the hours as listed on the certificate;
- (f) The license number of the Massachusetts engineer endorsing the certificate;

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(g) Hours of continuing education that the participant has completed.

18.04: Curriculum

(1) Engineers and Firemen Requiring 30 Hours of Continuing Education. The following topics shall be covered in any approved curriculum with the recommended time spent each topic:

(a) M.G.L. c. 146 and 522 CMR 1.00 through 17.00, with particular attention to M.G.L. c. 146, §§ 46~~M.G.L. c. 146, §§ 46 through 56~~56 and ~~522 CMR 2.00~~522 CMR 2.00.

1. Topic Description: M.-G.-L. c. 146 as it pertains to the licensing of engineers and firemen; operation, maintenance, inspection and repair of boilers.

2. Purpose: To ensure that all engineers and firemen have a thorough knowledge of Massachusetts General Laws and regulations as it pertains to boilers and turbines.

3. Recommended Time Allotted: ~~Four~~Two hours.

4. Recommended Instructional Methods: Lectures, discussion, and test.

5. Recommended Text: M.G.L. c. 146 and 522 CMR 1.00 through 17.00.

Recommended topics, or topics as approved by the Commissioner, may include but are not limited to the following:

(b) Steam Boiler Operation.

1. Topic Description: Safe boiler operation, including safe operation and maintenance practices of all appurtenances.

2. Purpose: To ensure that all engineers and firemen have a thorough knowledge of safe boiler operation and maintenance of all appurtenances.

3. Recommended Time Allotted: Eight hours.

4. Recommended Instructional Methods: Lectures, discussion and test.

5. Recommended Text:

a. Boiler Operators Guide-ISBN #0-07-036574-1

b. Stationary Engineering-ISBN #0-8269-4443-4

c. Powerplant Engineering-ISBN #0-07-019106-9

d. A.S.M.E. Code - Section VII, guidelines for the care of power boilers.

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| e. B & W "Steam" - ISBN_#09634570-0-4.

(c) Steam Turbine Operation.

1. Topic Description: Safe turbine operation, including safe operation and maintenance practices of all appurtenances.

2. Purpose: To ensure that all engineers and firemen have a thorough knowledge of safe turbine operation and maintenance of all appurtenances.

3. Recommended Time Allotted: Eight hours.

4. Recommended Instructional Methods: Lectures, discussion and test.

5. Recommended Text:

a. Boiler Operators Guide-ISBN #0-07-036574-1

b. Stationary Engineering-ISBN #0-8269-4443-4

| c. Powerplant Engineering-ISBN_#0-07-019106-9

| d. B & W "Steam" - ISBN_#09634570-0-4.

(d) National Board Inspection Code/A.S.M.E. Code Section I, IV,B31.1 Section 6

1. Topic Description: The structure and review of the National Board Inspection Code as well as the A.S.M.E. Codes as it relates to boiler construction.

2. Purpose: To ensure that all engineers and firemen have a working knowledge of the National Board Inspection Codes and A.S.M.E. Codes.

3. Recommended Time Allotted: Four hours.

4. Recommended Instructional Methods: Lectures, discussion and test.

5. Recommended Text:

a. National board inspection code

b. A.S.M.E. Code Section I, IV and B 31.1 Section 6

(e) Gas Turbines.

1. Topic Description: Gas turbine design and operation, including safe operation and maintenance practices of all appurtenances.
2. Purpose: To ensure all engineers and firemen have a working knowledge of gas turbine construction, operation, and maintenance, as they relate as an appurtenance of a boiler.
3. Recommended Time Allotted: Four hours.
4. Recommended Instructional Methods: Lectures, discussion and test.

5. Recommended Text: As determined by the Department

(2) Special-to-have-charge and Special-to-operate licenses Requiring Six Hours of Continuing Education. The following topic shall be covered in any approved curriculum with the recommended time spent on each topic:

(a) M.G.L. c. 146, 522 CMR 1.00 through 17.00, with particular attention to M.G.L. c. 146 §§ 46 through 56 and 522 CMR 2.00.

1. Topic Description: M.G.L. c. 146 as it pertains to the licensing of engineers and fireman; operation, maintenance, inspection and repair of boilers.

2. Purpose: To ensure that all engineers and fireman have a thorough knowledge of Massachusetts General Laws and regulations as it pertains to the license they hold.

3. Recommended Time Allotted: Two hours.

4. Recommended Instructional Methods: Lectures, discussion and test.

5. Recommended Text: M.G.L. c. 146 and 522 CMR 1.00 through 17.00.

(b) Steam Boiler Operation.

1. Topic Description: Safe boiler operation, including safe operation and maintenance practices of all appurtenances.

2. Purpose: To ensure that all engineers and fireman have a thorough knowledge of safe boiler operation and maintenance of all appurtenances.

3. Recommended Time Allotted: Four hours.

4. Recommended Instructional Methods: Lectures, discussion and test.

5. Recommended Text.

a. Boiler Operators Guide-ISBN #0-07-036574-1

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b. Stationary Engineering-ISBN #0-8269-4443-4

c. A.S.M.E. Code - Section VII, guidelines for the care of power boilers.

d. B & W "Steam" — ISBN #09634570-0-4.

18.05: Miscellaneous Provisions

(1) Any Massachusetts Engineer, Fireman or individual with a special-to-have-charge, or special-to-operate license who falsifies or misrepresents any certificate of completion shall be subject to a Department hearing which could result in the suspension or revocation of his or her Massachusetts Engineer, Fireman, or special-to-have-charge, or special-to-operate license.

(2) Any Massachusetts Engineer, Fireman or individual with a special-to-have-charge, or special-to-operate license who is not presently employed in the commonwealth, and can not obtain the required continuing education necessary to renew his or her license may, upon written request at the time of renewal, request that his or her license be placed in inactive status until such time that the continuing education requirements are fulfilled. Individuals making such request must submit the renewal fee as required by statute at the time of request.

(3) Inactive licenses prohibit those engineers or firemen from legally operating or to be in charge of any steam boiler or turbine/engine so long as the license is inactive.

(4) Engineer, Fireman, special-to-have-charge, or special-to-operate licenses not renewed, either active or inactive, at expiration date shall become void, and shall after one year be reinstated only by re-examination of the licensee.

(5) Any instructor added to a program, after a program has been approved, must be approved by the Commissioner or his/her designee.

(6) Monitors and instructors who are approved to conduct continuing education shall keep uniform records of attendance of licensees following the format provided by the Department, for a period of five years after the issuance of the licensees certificate of completion. They shall be responsible for the security of all uniform certificates and other Commissioner approved matter and the proper issuance thereof. Strict and accurate attendance records shall be kept and submitted to the Department, at its request, for review. The Department shall keep records of the issuance of uniform certificates and other matter as it relates to the approved programs. The falsification of attendance records and the fraudulent issuance of certificates or other Department matter by any licensees shall be grounds for initiating formal proceedings under M.G.L. c. 146, § 59 and c. 30A to show cause why their license or licenses should not be suspended or revoked.

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522 CMR 19.00: PORTABLE BOILERS

19.01 Scope and Application.

This section applies to all temporary use portable Boilers.

(1) The Owner/User of a portable Boiler is responsible for ensuring their Boiler is in compliance with this regulation.

(2) All portable Boilers covered by M.G.L. c. 146 must conform to the construction rules of the ASME Code, Section I and Section IV as applicable.

(3) Any portable Boiler brought into the Commonwealth from another jurisdiction shall be inspected as follows:

(a) The First Inspection required for any portable steam Boilers must be performed by a District Engineering Inspector and it must be issued a state number and annual Certificate from the Department.

(b) Any portable Boilers which has a current valid Massachusetts Certificate must receive an External Inspection under pressure by an Authorized Inspector or District Engineering Inspector prior to operation.

(4) Any portable Boiler already in the Commonwealth may be moved to another location within the Commonwealth and issued a Certificate under the following conditions:

(a) The portable Boiler has previously received a First Inspection by a District Engineering Inspector and assigned a State Boiler number and;

(b) The portable Boiler has been internally inspected by an Authorized Inspector or District Engineering Inspector within the past year and;

(c) Hot water Boilers must be internally inspected every 3 years by an Authorized Inspector or District Engineering Inspector;

(d) An operational inspection under pressure of a Low Pressure/Heating Boiler is conducted by an Authorized Inspector or District Engineering Inspector before the Certificate is issued at that location;

(e) An operational inspection under pressure of a High Pressure/Power Boiler is conducted by an Authorized Inspector or District Engineering Inspector before the Certificate is issued at that location;

(f) All Engineers and Firemen in charge of a portable Boiler shall notify the Department in writing, within seven days of their appointment, of the location of the portable Boiler of which they are in charge. When accepting or leaving a position as an Engineer or Fireman in charge, the Engineer or Fireman shall notify the Department within seven days.

(5) Hot water Low Pressure/Heating Boilers must receive an External Inspection operating under pressure by an Authorized Inspector or District Engineering Inspector at the location of installation before a Certificate may be issued.

~~(6) The Certificate is only valid for the location at which the Boiler is placed into operation. Once the Boiler is moved the Certificate is no longer valid.~~

(76) The company is required to notify the Department in a format approved by the Department in advance or as soon as practicable when they are bringing a portable Boiler into the Commonwealth or moving a Boiler to a new location.

(87) High Pressure/Power Boilers shall be trimmed to meet the following requirements: The discharge from the blowdown systems (bottom, surface, or LWCOs) must be directed to either a blow down tank on the portable trailer or hard piped to a blow down tank at the location.

(98) High Pressure/Power Boilers must have certification for the Boiler external piping as defined in the ASME Section I Code. This could be documented as follows:

- (a) On the Boilers ASME required manufacturers data report forms;
- (b) Stamped on the PP Piping;
- (c) On a name plate attached to the Boiler or PP Piping; or
- (d) With manufacturers documentation demonstrating that the piping or hoses comply with the maximum pressure and temperature ratings of the Boiler.

(409) Low Pressure/Heating Boiler shall have the blow down systems discharge to a blowdown tank.

(104) In cases where the Boiler may be set up for multiple controls (high and low pressure operation), only one set of controls may be physically connected to control the burner. All other controls must be physically disconnected and removed. A change of service from High Pressure to Low Pressure or Low Pressure to High Pressure requires a re-inspection and a new Certificate and safety valve will be changed to reflect the proper MAWP.

(112) Installed Boiler controls must be designed for the intended range of operation. High Pressure controls shall not be reset to function as Low Pressure controls.

(123) Where required by M.G.L. c. 146 and 522 CMR, the appropriate license for the Engineer in Charge and the Operator of the portable Boiler must be posted on site.

(134) The location of installation should be noted in the inspection form under "location".